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THE **BOEING** COMPANY

CODE IDENT NO. 81205

NUMBER D2-13957-5

TITLE STATISTICAL MEANS AND DISPERSIONS FOR THE MASS PROPERTIES
OF BOEING COMPONENTS FOR THE WING I OPERATIONAL MINUTEMAN
MISSILE -- June 1, 1963

MODEL NO. WS-133 CONTRACT NO. AF04(694)-46

ISSUE NO. 13 ISSUED TO ASTIA

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SUMMARY

This report presents statistical means and dispersions for the mass properties of the Boeing components of the Operational Minuteman missile. The data are based upon a statistical analysis of the hardware produced for the Wing I Operational missiles.

1.0 INTRODUCTION

1.1 REFERENCES

- 1.1.1 BSD Exhibit 62-45, "Mass Properties Control Data for WS-133A Operational Guided Missiles/Systems," Dated 3 August 1962.
- 1.1.2 BSD Exhibit 62-110, "Missile Assembly Facility Requirements for Mass Properties Data," Dated 3 August 1962.
- 1.1.3 Boeing Document D2-13944-xxx, "Flight Article Mass Properties Report for Missile xxx Components."
- 1.1.4 Boeing Document D2-13945-xxx, "Air Force Plant 77 Flight Article Mass Properties Report for Missile xxx."
- 1.1.5 Boeing Document D2-13943, "Flight Article Mass Properties Report for CTLI Installation."

1.2 DISCUSSION

This report of statistical means and dispersions for the mass properties of the Boeing components of the Operational Wing I Minuteman missiles is presented in accordance with Reference 1.1.1. The data are based upon the mass properties found in the documents of Reference 1.1.3, 1.1.4, and 1.1.5.

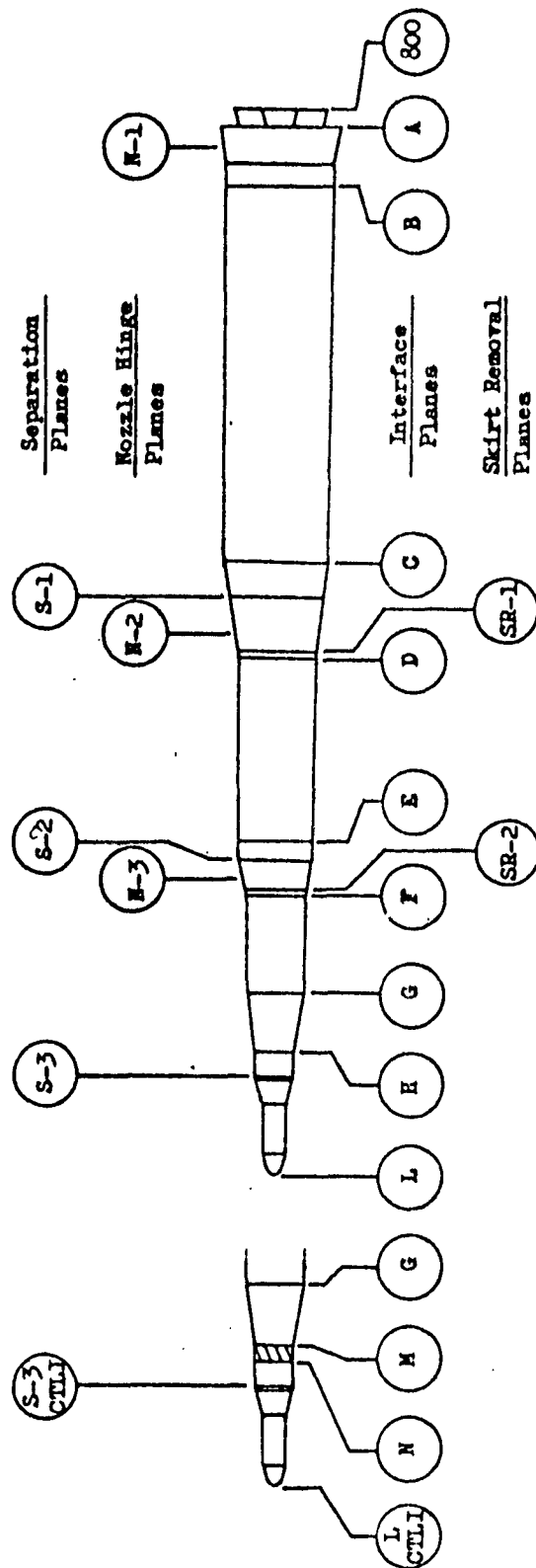
The statistical analysis contained in this report is based upon data obtained during the entire production run of Operational Wing I missiles and the first eleven sets of Wing I CTLI flight hardware. Therefore, this report will be the last one covering the Wing I Operational missile and subsequent reports in this series will only cover the Wing I CTLI installations. The data are presented in four sections; (1) flight sequential summaries, (2) statistical means and dispersions data calculations, (3) CTLI installation means and dispersions data, and (4) data samples for the CTLI section, interstages, aft skirt, base heat deflectors, raceway covers and caps, and miscellaneous minor components. The effect of engineering change proposals (ECP) incorporated thus far on the flight hardware is noted where the change causes a significant weight difference. The documents of References 1.1.3, 1.1.4, and 1.1.5 list all the ECP's committed to the hardware included in this statistical analysis along with their individual effects.

All dispersion computations found in this report are based upon a population of .990 and a confidence level of 90% in accordance with directions received from STL on 30 January 1963.

1.3 MISSILE STATION DIAGRAM

See page 7 for a station diagram showing both missile and section stations.

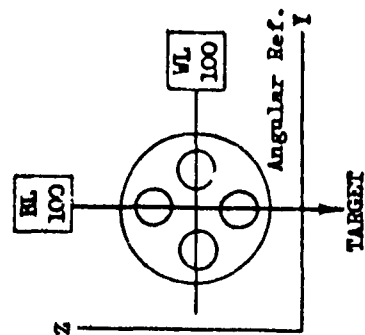
1.3 WING I OPERATIONAL AND CTLI MISSILE STATION DIAGRAM



△ These Missile Stations become 50,000 when converted to Boeing Section Stations.

SEPARATION PLANES	MISSILE STA	INTERFACE PLANES	MISSILE STA
S-1	504.420	A	787.055
S-2	346.030	B	750.995
S-3	219.135	C	528.355
S-3 CTLI	209.135	D	469.273
		E	360.340
SKIRT REMOVAL PLANES		F	321.990
SR-1	469.70	G	260.215
SR-2	322.51	H	228.715
		L	155.715
NOZZLE HINGE PLANES			
N-1	778.788	M	228.715
N-2	460.853	N	218.715
N-3	330.090	L CTLI	145.715

Reference
25-19999
DCN-E



2.0

FLIGHT SEQUENTIAL MASS DATA SUMMARY

The following page presents a flight sequential data summary of all Boeing airborne components excluding the CMLI installation which is presented in Section 4.0. Sequential summaries by production section are also included as additional reference data.

The data are in sequential form showing mean values for weight, three plane balance, and moments of inertia. Dispersions about these means are included for weight and three plane balance. However, the dispersions given for sequential conditions other than "Prelaunch" are based upon calculations since actual data to verify these points are not available. The ablation rates for base heating are those which STL has directed to be used. The skirt jettison times are separation plus 20 seconds + 4 seconds (Stage II) and separation plus 500 milliseconds + 200 milliseconds (Stage III).

2.1 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)															
MISSILE															
COMPONENT TOTAL BORING RESPONSIBILITY															
L I N E		S T A G E	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY				MOMENT OF INERTIA SLUG FEET ²				
					NOM.	DISP.	LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW
							NOM.	DISP.	NOM.	DISP.	NOM.	DISP.			
1	I	Pre-Launch		0	1058.10	14.70	564.52	2.87	101.22	.21	102.50	.21	182.5	6677.5	6671.0
2				25	999.84	15.15	558.27	3.19	101.20	.22	102.49	.22	170.5	6228.1	6221.7
3				50	992.40	15.19	556.79	3.24	101.20	.22	102.49	.22	168.9	6151.9	6145.6
4				75	984.94	15.23	555.28	3.29	101.20	.22	102.48	.22	167.2	6075.8	6069.4
5		End Action Time		100	977.50	15.32	553.76	3.35	101.19	.23	102.48	.22	165.6	5999.6	5993.3
6															
7	II	Start Action Time		0	498.66	12.07	420.01	1.96	100.52	.17	102.25	.17	57.1	647.2	645.6
8				25	491.36	12.08	419.02	2.00	100.50	.17	102.25	.17	56.2	639.5	638.0
9		Skirt Jettison		35	277.25	5.63	359.62	1.37	101.62	.66	103.41	.29	23.9	225.9	224.6
10				50	276.05	5.63	364.96	1.59	101.60	.30	103.55	.29	23.9	222.9	221.6
11				75	273.95	5.64	364.01	1.60	101.57	.30	103.52	.29	23.8	215.3	213.9
12		End Action Time		100	271.85	5.43	363.06	1.43	101.54	.30	103.50	.30	23.8	207.7	206.3
13															
14	III	Start Action Time		0	141.29	4.98	327.85	.57	101.19	.17	102.59	.35	12.4	15.0	14.2
15		Skirt Jettison		1	47.90	1.93	317.01	1.26	104.83	.29	106.94	.43	2.2	6.6	6.2
16				25	46.65	1.94	316.51	1.29	104.75	.31	106.88	.45	2.2	6.5	6.1
17				50	45.40	1.95	315.98	1.32	104.66	.33	106.82	.48	2.1	6.4	6.0
18				75	44.15	1.96	315.39	1.35	104.56	.35	106.75	.50	2.0	6.3	5.8
19		End Action Time		100	42.90	2.00	314.75	1.39	104.46	.37	106.68	.53	2.0	6.2	5.7
20															
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME															
21	I	Silo Heat Protection			50.8		659.4		101.4		102.5				
22		Base Heat Protection			29.8		771.6		100.7		101.1				
23															
24	II	Aft Interstage 1-2			131.35		515.69		101.28		100.78				
25		Jettisoned Fwd Interstage 1-2			211.61		488.31		99.03		100.55				
26		Base Heat Protection			15.7		487.0		103.2		103.9				
27															
28	III	Aft Interstage 2-3			72.48		350.93		99.33		101.81				
29		Jettisoned Fwd Interstage 2-3			93.39		334.17		99.33		100.36				
30		Base Heat Protection			5.0		331.6		108.0		109.2				
31															

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2.2 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																			
MISSILE _____ COMPONENT SECTION 42 (GUIDANCE SECTION) _____																			
L I N E		S T A G E		FLIGHT SEQUENCE		% EXP WT		WEIGHT			CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²		
								NOM.	DISP.	LONG. (X)	LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
I	Pre-Launch																		
II	Start Action Time																		
III	Start Action Time																		

2.3 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)

COMPONENT SECTION 44 (STAGE 3 MOTOR)

MISSILE		SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)														COMPONENT SECTION 44 (STAGE 3 MOTOR)									
L I N E		S T A G E		FLIGHT SEQUENCE		% EXP WT		WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLDG FEET ²									
										LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW							
								NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.						
1	I	Pre-Launch		0		20.10	1.49	94.56	1.79	106.66	.41	111.21	.52	.3				3.8	3.5						
2				25		19.50	1.49	94.72	1.86	106.55	.42	111.01	.55				3.7	3.4							
3				50																					
4				75																					
5		End Action Time		100																					
6																									
7	II	Start Action Time		0																					
8				25																					
9		Skirt Jettison																							
10				50																					
11				75																					
12		End Action Time		100																					
13																									
14	III	Start Action Time		0																					
15		Skirt Jettison		1		19.50	1.49	94.72	1.86	106.55	.42	111.01	.55												
16				25		19.40	1.49	94.53	1.86	106.58	.43	111.06	.55												
17				50		19.30	1.49	94.34	1.86	106.62	.43	111.12	.55												
18				75		19.20	1.49	94.14	1.86	106.65	.43	111.18	.55												
19		End Action Time		100		19.10	1.49	93.95	1.86	106.68	.43	111.24	.55	.3			3.6	3.3							
20																									
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																									
21	I	Silo Heat Protection				.60	.10	89.20	0	110.30	0	117.70	0												
22		Base Heat Protection																							
23																									
24	II	Aft Interstage 1-2																							
25		Jettisoned Fwd Interstage 1-2																							
26		Base Heat Protection																							
27																									
28	III	Aft Interstage 2-3																							
29		Jettisoned Fwd Interstage 2-3																							
30		Base Heat Protection				.40	0	131.80	0	100.00	0	100.00	0												
31																									

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SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																
MISSILE WING I OPERATIONAL COMPONENT SECTION 45 (INTERSTAGE 2-3)																
FLIGHT SEQUENCE			% EXP WT	WEIGHT		CENTER OF GRAVITY				MOMENT OF INERTIA						
				NOM.	DISP.	LONG. (X)	LAT. (Y)		VERT. (Z)	ROLL	PITCH	YAW				
LINE	STAGE					NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.
1	I	Pre-Launch	0	197.55	4.75	67.33	.28	99.98	.32	101.45	.28	19.6	15.2	14.9		
2			25	193.25	4.76	67.19	.29	99.96	.33	101.46	.28	19.2	14.9	14.6		
3			50													
4			75													
5		End Action Time	100													
6																
7	II	Start Action Time	0													
8			25													
9		Skirt Jettison														
10			50													
11			75													
12		End Action Time	100	193.25	4.76	67.19	.29	99.96	.33	101.46	.28	19.2	14.9	14.6		
13																
14	III	Start Action Time	0	120.77	4.57	60.14	.13	100.34	.10	101.25	.11	11.5	7.2	7.0		
15		Skirt Jettison		27.38	1.23	53.17	.32	103.79	.28	104.30	.32	1.7	1.1	1.1		
16			25	26.23	1.24	52.93	.34	103.58	.29	104.05	.34	1.6	1.1	1.1		
17			50	25.08	1.25	52.67	.37	103.34	.31	103.78	.37	1.6	1.0	1.0		
18			75	23.93	1.27	52.38	.40	103.08	.34	103.48	.40	1.5	1.0	1.0		
19		End Action Time	100	22.78	1.33	52.06	.45	102.80	.38	103.15	.44	1.4	.9	.9		
20																
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																
21	I	Silo Heat Protection		4.30	.40	73.50	0	100.50	0	100.80	0					
22		Base Heat Protection														
23																
24	II	Aft Interstage 1-2														
25		Jettisoned Fwd Interstage 1-2														
26		Base Heat Protection														
27																
28	III	Aft Interstage 2-3		72.48	3.62	78.94										
29		Jettisoned Fwd Interstage 2-3		93.39	4.67	62.18										
30		Base Heat Protection		4.60	.50	58.7	0	108.70		100.36						
31										110.00	0					

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MISSILE		2.5 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)										COMPONENT SECTION 46 (STAGE 2 MOTOR)									
LINE	STAGE	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²									
				NOM.	DISP.	LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW							
						NOM.	DISP.	NOM.	DISP.	NOM.	DISP.				NOM.	NOM.					
1	I	Pre-Launch	0	38.62	1.82	149.37	2.93	105.48	.38	109.53	.56	1.1	20.9	20.3							
2			25	37.62	1.83	150.58	3.04	105.30	.39	109.22	.59		20.4	19.8							
3			50																		
4			75																		
5		End Action Time	100																		
6																					
7	II	Start Action Time	0	37.62	1.83	150.58	3.04	105.30	.39	109.22	.59		20.4	19.8							
8			25	36.82	1.83	149.77	3.08	105.42	.40	109.42	.60		19.9	19.4							
9		Skirt Jettison	35	36.42	1.84	149.36	3.12	105.48	.40	109.53	.60		19.7	19.2							
10			50	35.97	1.84	148.88	3.14	105.55	.41	109.65	.61	1.1	19.4	18.9							
11			75	35.12	1.84	147.94	3.19	105.68	.41	109.88	.62	1.0	19.0	18.5							
12		End Action Time	100	34.32	1.85	147.01	3.26	105.81	.42	110.11	.63	1.0	18.6	18.1							
13																					
14	III	Start Action Time	0																		
15		Skirt Jettison																			
16			25																		
17			50																		
18			75																		
19		End Action Time	100																		
20																					
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																					
21	I	Silo Heat Protection		1.00	.10	103.90	0	112.30	0	121.20	0										
22		Base Heat Protection																			
23																					
24	II	Aft Interstage 1-2																			
25		Jettisoned Fwd Interstage 1-2																			
26		Base Heat Protection		3.30	.20	187.70	0	100.00	0	100.00	0										
27																					
28	III	Aft Interstage 2-3																			
29		Jettisoned Fwd Interstage 2-3																			
30		Base Heat Protection																			
31																					

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SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																
MISSILE																
COMPONENT SECTION 47 (INTERSTAGE 1-2)																
L I N E		S T A G E	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY				MOMENT OF INERTIA SLUG FEET ²					
					NOM.	DISP.	LONG. (X)	DISP.	NOM.	DISP.	LAT. (Y)	DISP.	NOM.	DISP.	ROLL	PITCH
1	I		Pre-Launch	0	389.12	7.02	77.64	100.29	.35	101.02	.32		63.9	55.3	54.6	
2				25	378.62	7.06	77.48	100.28	.36	101.01	.33		62.2	53.8	53.1	
3				50												
4				75												
5			End Action Time	100	378.62	7.06	77.48	100.28	.36	101.01	.33		62.2	53.8	53.1	
6																
7	II		Start Action Time	0	247.27	10.84	67.42	99.75	.09	101.13	.09		35.2	22.8	22.8	
8				25	240.77	10.85	67.46	99.69	.09	101.09	.09		34.3	22.2	22.2	
9			Skirt Jettison		27.06	1.84	54.78	104.79	.57	105.37	.54		2.4	1.5	1.5	
10				50	26.31	1.86	54.61	104.66	.59	105.19	.56		2.4	1.5	1.5	
11				75	25.06	1.88	54.29	104.43	.63	104.86	.60		2.3	1.4	1.4	
12			End Action Time	100	23.76	1.90	53.92	104.16	.67	104.49	.66		2.1	1.3	1.3	
13																
14	III		Start Action Time	0												
15			Skirt Jettison													
16				25												
17				50												
18				75												
19			End Action Time	100												
20																
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																
21	I		Silo Heat Protection		10.50	1.00	83.40	0	100.80	0	101.40	0				
22			Base Heat Protection													
23																
24	II		Aft Interstage 1-2		131.35	6.56	96.42			101.28						
25			Jettisoned Fwd Interstage 1-2		211.61	10.58	69.04			99.03						
26			Base Heat Protection		12.40	1.20	64.80	0	104.00	0	104.90	0				
27																
28	III		Aft Interstage 2-3													
29			Jettisoned Fwd Interstage 2-3													
30			Base Heat Protection													
31																

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2.7 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)															
COMPONENT SECTION 48 (STAGE 1 MOTOR)															
MISSILE															
L I N E	S T A G E	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLDG FEET ²			
				NOM.	DISP.	LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW	
						NOM.	DISP.	NOM.	DISP.	NOM.	DISP.				
1	I	Pre-Launch	0	58.14	2.37	219.40	4.23	110.70	.38	118.41	.58	3.5	107.7	106.2	
2			25	54.99	2.38	222.77	-4.57	110.33	.41	117.77	.63	3.3	102.0	100.5	
3			50	54.24	2.38	223.63	4.66	110.23	.42	117.60	.64	3.2	100.5	99.1	
4			75	53.49	2.38	224.52	4.75	110.14	.43	117.43	.65	3.2	99.2	97.8	
5		End Action Time	100	52.74	2.39	225.43	4.85	110.04	.44	117.26	.67	3.1	97.7	96.3	
6															
7	II	Start Action Time	0												
8			25												
9		Skirt Jettison													
10			50												
11			75												
12		End Action Time	100												
13															
14	III	Start Action Time	0												
15		Skirt Jettison													
16			25												
17			50												
18			75												
19		End Action Time	100												
20															
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME															
21	I	Silo Heat Protection		2.40	.20	160.50	0	117.20	0	129.70	0				
22		Base Heat Protection		3.00	.30	160.50	0	117.20	0	129.70	0				
23															
24	II	Aft Interstage 1-2													
25		Jettisoned Fwd Interstage 1-2													
26		Base Heat Protection													
27															
28	III	Aft Interstage 2-3													
29		Jettisoned Fwd Interstage 2-3													
30		Base Heat Protection													
31															

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2.8		SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)												
MISSILE		COMPONENT SECTION 49 (AFT SKIRT)												
L I N E	S T A G E	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY				MOMENT OF INERTIA SLUG FEET ²				
				NOM.	DISP.	LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL NOM.	PITCH NOM.	YAW NOM.
						NOM.	DISP.	NOM.	DISP.	NOM.	DISP.			
1	I	Pre-Launch	0	353.55	11.54	68.64	.35	100.61	.34	100.83	.28	88.4	52.6	52.3
2			25	314.85	12.07	69.07	.40	100.67	.38	100.91	.32	78.8	46.9	46.6
3			50	308.15	12.13	69.10	.40	100.68	.39	100.93	.33	77.1	45.9	45.6
4			75	301.45	12.18	69.12	.41	100.70	.40	100.94	.33	75.4	44.9	44.7
5		End Action Time	100	294.75	12.28	69.15	.42	100.71	.41	100.96	.34	73.8	43.9	43.7
6														
7	II	Start Action Time	0											
8			25											
9		Skirt Jettison												
10			50											
11			75											
12		End Action Time	100											
13														
14	III	Start Action Time	0											
15		Skirt Jettison												
16			25											
17			50											
18			75											
19		End Action Time	100											
20														
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME														
21	I	Silo Heat Protection		32.00	3.20	67.90	0	100.10	0	100.20	0			
22		Base Heat Protection		26.80	2.70	67.90	0	100.10	0	100.20	0			
23														
24	II	Aft Interstage 1-2												
25		Jettisoned Fwd Interstage 1-2												
26		Base Heat Protection												
27														
28	III	Aft Interstage 2-3												
29		Jettisoned Fwd Interstage 2-3												
30		Base Heat Protection												
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MEANS AND DISPERSIONS DATA CALCULATIONS BY MISSILE SECTIONS

The data summarized on the following pages were accumulated during the manufacture of components for the Wing I Operational missiles and two ground test missiles, GYM-010 and GYM-077. However, the interstages and the aft skirt of GYM-077 were eliminated from the sample since the hardware was not in a flight weight configuration.

The data are calculated for all flight sequential conditions by total missile and by individual production sections. However, in order to reduce the size of this report, only selected conditions have been included in the following section. The conditions are as follows:

- (1) Start action, stage one - total missile
- (2) Start action, stage two - total missile
- (3) Skirt jettison, stage two - total missile
- (4) Start action, stage three - total missile
- (5) Skirt jettison, stage three-total missile
- (6) Prelaunch, stage one - each production section

In order to complete some of the sequential conditions, calculated means and dispersions have been included for some components whose changes from the prelaunch condition could not be determined by actual measurement.

Detailed derivation of the mean and dispersion values for inter-stage structure, aft skirt structure, base heat deflectors, and raceway covers and caps will be found in section 5 of this report. Totals for the remaining components are also included in section 5 but their details have been omitted for reasons of brevity.

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
T 42	PRELAUNCH	1.02	0.10	259.62	0.	100.00	0.	100.00	0.			
T 44	PRELAUNCH	20.10	1.49	304.78	1.79	106.66	0.41	111.21	0.52			
T 45	PRELAUNCH	197.55	4.75	339.32	0.28	99.98	0.32	101.45	0.28			
T 46	PRELAUNCH	38.62	1.82	459.71	2.93	105.48	0.38	109.53	0.56			
T 47	PRELAUNCH	389.12	7.02	496.91	0.37	100.29	0.35	101.02	0.32			
T 48	PRELAUNCH	58.14	2.37	697.86	4.23	110.70	0.38	118.41	0.58			
T 49	PRELAUNCH	353.55	11.54	769.94	0.35	100.61	0.34	100.83	0.28			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.113682E 06	0.377656E 05	0.300784E 05	0.727589E 07	0.757671E 03	0.225654E 04
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.319	0.184	0.164	2.549	0.026	0.045

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
MISSILE PRELAUNCH	1058.10	14.70	564.52	2.87	101.22	0.21	102.50	0.21			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
T 42	S A STG 2	1.02	3.10	259.62	0.	100.00	0.	100.00	0.			
T 44	S A STG 2	19.50	1.49	304.94	1.86	106.55	0.42	111.01	0.55			
T 45	S A STG 2	193.25	4.76	339.18	0.29	99.96	0.33	101.46	0.28			
T 46	S A STG 2	37.62	1.83	460.92	3.04	105.30	0.39	109.22	0.59			
T 47	S A STG 2	247.27	13.84	486.69	0.12	99.75	0.39	101.13	0.09			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.184160E 05	-0.484452E 04	0.403082E 04	0.705768E 06	0.233506E 03	0.495131E 03
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.272	0.140	0.127	1.685	3.031	0.045

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
MISSILE S A STG 2	498.66	12.07	420.01	1.96	100.52	0.17	102.25	0.17			

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WEIGHT AND BALANCE

INPUT

MRCV	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
T 42	SKIRT JETT	1.02	0.10	259.62	0.	100.00	0.	100.00	0.			
T 44	SKIRT JETT	19.50	1.49	304.94	1.86	106.55	0.42	111.01	0.55			
T 45	SKIRT JETT	193.25	4.76	333.18	0.29	93.96	0.33	101.46	0.28			
T 46	SKIRT JETT	36.42	1.84	453.70	3.12	105.48	0.40	109.53	0.60			
T 47	SKIRT JETT	27.06	1.84	414.06	0.80	104.79	5.78	103.70	0.54			

SUMMARY

W DELTA X	0.178368E 05	W DELTA Y	0.288093E 05	W DELTA Z	0.373395E 04	DELTA W X	0.601481E 05	DELTA W Y	0.203888E 03	DELTA W Z	0.341540E 03
WDX/W	0.482	WDY/W	0.612	WDZ/W	0.220	DWDX/W	0.885	DWDY/W	3.051	DWDZ/W	0.067

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
MISSILE SKIRT JETT	277.25	5.63	357.62	1.37	101.62	0.66	103.41	0.29			

(STAGE 2)

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WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
T 42	S A SIG 3	1.02	0.10	259.62	0.	100.00	0.	100.00	0.			
T 44	S A SIG 3	19.50	1.43	304.94	1.86	106.55	0.42	111.31	0.55			
T 45	S A SIG 3	120.77	4.75	332.13	0.13	100.34	0.10	101.25	0.28			

SUMMARY

W DELTA X	0.156201E 04	W DELTA Y	0.212930E 03	W DELTA Z	0.125852E 04	DELTA W X	0.162477E 04	DELTA W Y	0.801659E 02	DELTA W Z	0.197931E 03
WDX/W	0.280	WDY/W	0.103	WDZ/W	0.251	DWDX/W	0.285	DWDY/W	3.063	DWDZ/W	0.100

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
MISSILE S A SIG 3	141.29	4.93	327.85	0.57	101.13	0.17	102.59	0.35			

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WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
T 42	SKIRT JETT	1.02	3.10	259.62	0.	100.00	0.	100.00	0.			
T 44	SKIRT JETT	19.50	1.49	304.94	1.86	106.55	0.42	111.01	0.55			
T 45	SKIRT JETT	27.38	1.23	327.74	0.32	103.79	0.28	104.30	0.32			

SUMMARY

W DELTA X	0.139228E 04	W DELTA Y	0.125850E 03	W DELTA Z	0.191791E 03	DELTA W X	0.530502E 03	DELTA W Y	0.842494E 01	DELTA W Z	0.478011E 02
WDX/W	0.779	WDY/W	0.234	WDZ/W	0.289	DWDX/W	0.481	DWDY/W	3.061	DWDZ/W	0.144

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
MISSILE SKIRT JETT	47.90	1.93	317.01	1.26	104.83	0.29	106.94	0.43			

(STAGE 3)

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WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6009	ATTACH 42	1.02	3.10	259.62	0.	100.00	0.	100.00	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.	0.	0.	0.145519E-12	0.909495E-14	0.909495E-14
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.	0.	0.	0.000	3.000	0.000

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6009 ATTACH 42	1.02	3.10	259.62	0.00	100.00	0.00	100.00	0.00			

~~ATTACHMENTS~~
SECT 42 PRELAUNCH

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WEIGHT AND BALANCE

MRCN	DESCRIPTION	WT	WT DISP	INPUT				IX	IY	IZ
				X	Y	Z	DISP			
6006	BASE HEAT DFL	6.12	0.33	133.10	0.66	100.00	0.			
6005	RACEWAY COMP	8.72	0.52	79.33	1.83	110.24	0.49			
6011	SUPPORT COMP	2.17	0.11	64.14	0.48	108.70	0.07			
6010	INSUL COMP	0.33	0.	81.76	0.	110.18	0.			
6009	ATTACHMENTS	0.77	0.	75.04	0.	106.77	0.			
6009	BMS 5-62	1.99	1.35	85.60	0.	108.60	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.272045E 03	0.182799E 02	0.117934E 02	0.381922E 03	0.152084E 02	0.499358E 02
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.821	0.213	0.171	0.972	0.194	0.352

TOTALS

DESCRIPTION	WT	WT DISP					IX	IY	IZ
			X	Y	Z	DISP			
SECT 44 PRELAUNCH	20.10	1.49	94.56	106.66	111.21	0.41			

WEIGHT AND BALANCE

MRCN	DESCRIPTION	WT	WT	DISP	X	DISP	Y	DISP	Z	IX	IY	IZ
6501	2-3 INTSTG	169.00	4.48	0.23	67.59	0.23	99.35	0.31	100.82			
6005	RACEWAY COMP2	1.53	0.13	1.00	55.40	1.00	110.30	0.50	117.60			
6005	RACEWAY COMP3	1.35	0.14	1.00	85.20	1.00	111.60	0.50	119.90			
6507	DISC BRKT 1	5.08	0.48	0.36	61.21	0.36	110.64	0.19	110.64			
6507	DISC BRKT 2	1.05	0.15	0.06	70.80	0.06	112.86	0.20	112.94			
6503	ORD ASSY 2	3.35	0.02	0.01	61.82	0.01	90.86	0.02	97.14			
6503	ORD ASSY 3	1.21	0.01	0.01	74.00	0.01	99.34	0.01	98.78			
6011	SUPPORT COM1	3.10	0.23	0.40	55.56	0.40	110.55	0.09	115.01			
6011	SUPPORT COM3	0.51	0.05	0.00	89.00	0.00	111.10	0.00	119.20			
6020	ARM DISARM 3	2.84	0.02	0.00	78.10	0.00	90.50	0.00	81.50			
6010	INSUL COMP 2	1.24	0.08	0.64	62.16	0.64	103.84	0.62	103.84			
6009	BMS 5-62 1	0.77	0.75	0.00	59.40	0.00	110.00	0.00	112.10			
6009	BMS 5-62 2	1.65	0.98	0.00	60.70	0.00	102.80	0.00	102.00			
6009	BMS 5-62 3	0.53	0.76	0.00	85.00	0.00	103.00	0.00	101.80			
6009	ATTACHMENTS 3	1.70	0.00	0.00	86.88	0.00	99.56	0.00	102.16			
6009	ATTACHMENTS 1	2.00	0.00	0.00	51.11	0.00	101.38	0.00	101.49			
6009	ATTACHMENTS 2	0.64	0.00	0.00	61.03	0.00	108.76	0.00	112.32			

SUMMARY

W DELTA X	0.152059E 04	W DELTA Y	0.274740E 04	W DELTA Z	0.193345E 04	DELTA W X	0.285596E 03	DELTA W Y	0.118100E 03	DELTA W Z	0.116337E 03
WDX/W	0.197	WDY/W	0.265	WDZ/W	0.223	DWDX/W	0.086	DWDY/W	0.055	DWDZ/W	0.055

TOTALS

DESCRIPTION	WT	WT	DISP	X	DISP	Y	DISP	Z	IX	IY	IZ
SECT 45 PRELAUNCH	197.55	4.75	0.28	67.33	0.28	99.93	0.32	101.45			

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WEIGHT AND BALANCE

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6008	BASE HEAT OFL	20.19	0.88	190.70	0.54	100.00	0.	100.00	0.			
6005	RACEWAY COMP	15.17	1.03	103.32	2.41	111.88	0.32	120.72	0.32			
6010	INSUL COMP	0.47	0.05	99.78	6.25	111.82	0.01	120.58	0.02			
6009	ATTACHMENTS	0.87	0.	101.00	0.	108.31	0.	113.32	0.			
6009	BMS 5-62	1.92	1.22	112.70	0.	109.80	0.	117.00	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.146411E 04	0.235652E 02	0.235653E 02	0.558043E 04	0.945024E 02	0.286391E 03
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.991	0.126	0.126	1.934	0.252	0.438

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 46 PRELAUNCH	38.62	1.82	149.37	2.93	105.48	0.38	109.53	0.56			

WEIGHT AND BALANCE

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	Iz
6701	1-2 INSTG	355.76	6.72	77.94	0.32	99.88	0.33	100.32	0.30			
6005	RACEWAY COMP2	0.91	0.10	53.00	1.00	112.00	0.50	120.40	0.50			
6005	RACEWAY COMP3	2.73	0.19	104.60	1.00	116.00	0.50	129.50	0.50			
6706	DISC BRKT 1	9.10	1.32	63.73	0.68	113.55	0.25	113.55	0.25			
6706	DISC BRKT 2	1.88	0.16	80.00	0.	117.23	0.13	117.27	0.13			
6703	ORD ASSEMBLY2	4.49	0.06	68.43	0.21	84.27	0.10	107.88	0.05			
6703	ORD ASSEMBLY3	1.55	0.01	85.15	0.	99.59	0.	98.61	0.01			
6020	ARM DISARM 3	2.84	0.02	89.40	0.	92.00	0.	73.00	0.			
6010	INSUL COMP	1.43	0.07	67.42	0.04	98.68	0.07	99.56	0.02			
6011	SUPPORT COMPI	2.38	0.25	58.05	0.69	113.03	0.15	118.60	0.21			
6011	SUPPORT COMPI	0.73	0.04	108.14	0.07	115.70	0.02	129.52	0.03			
6009	ATTACHMENTS 1	1.47	0.	53.11	0.	102.87	0.	102.87	0.			
6009	ATTACHMENTS 2	0.49	0.	73.89	0.	114.20	0.	109.69	0.			
6009	ATTACHMENTS 3	1.35	0.	108.97	0.	100.70	0.	102.33	0.			
6009	RMS 5-62 1	0.74	0.95	65.00	0.	99.60	0.	102.20	0.			
6009	RMS 5-62 2	1.57	0.95	65.00	0.	99.60	0.	102.20	0.			
6009	RMS 5-62 3	0.70	0.61	94.70	0.	102.00	0.	103.40	0.			

SUMMARY

W DELTA X	0.130025E 05	W DELTA Y	0.137895E 05	W DELTA Z	0.113974E 05	DELTA W X	0.796902E 03	DELTA W Y	0.345004E 03	DELTA W Z	0.361205E 03
WDX/W	0.293	WDY/W	0.302	WDZ/W	0.274	DWDX/W	0.073	DWDY/W	0.048	DWDZ/W	0.049

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	Iz
SECT 47 PRELAUNCH	389.12	7.02	77.64	0.37	100.29	0.35	101.02	0.32			

WEIGHT AND BALANCE

MRCN	DESCRIPTION	WT	WT DISP	INPUT			IX	IY	IZ
				X	Y	Z			
6007	BASE HEAT OFL	21.35	0.87	318.38	100.00	100.00			
6005	RACEWAY COMP	29.96	1.25	161.11	117.20	129.63			
6010	INSUL COMP	0.59	0.	147.52	0.	129.80			
6009	ATTACHMENTS	1.32	0.	169.27	114.73	123.76			
6009	BMS 5-62	4.92	1.81	166.90	115.70	127.20			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.972582E 04	0.434439E 02	0.474831E 02	0.217539E 05	0.234544E 03	0.706219E 03
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
1.696	0.113	0.119	2.537	0.263	0.457

TOTALS

DESCRIPTION	WT	X			Y			Z		
		WT	DISP	DISP	WT	DISP	DISP	WT	DISP	DISP
SECT 48 PRELAUNCH	58.14	2.37	219.40	4.23	110.70	0.38	118.41	0.58		

WEIGHT AND BALANCE

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
6901	AFT SKIRT	340.36	10.83	69.19	0.33	100.42	0.33	100.51	0.26			
6005	RACEWAY COMP	1.61	0.13	53.92	1.00	117.80	0.50	129.80	0.50			
6011	SUPPORT COMP	1.30	0.23	62.95	1.34	116.76	0.22	127.47	0.06			
6009	ATTACHMENTS	1.84	0.	52.56	0.	104.15	0.	106.83	0.			
6009	BMS 5-62	8.44	3.99	66.30	0.	101.70	0.	103.00	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.126211E 05	0.126162E 05	0.783177E 04	0.124051E 03	0.419342E 02	0.138716E 03
WDY/W	WDZ/W	WDY/W	WDZ/W		
0.318	0.318	0.250	0.032	0.018	0.033

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
SECT 49 PRELAUNCH	353.55	11.54	68.94	0.35	100.61	0.34	100.83	0.28			

OTLI DATA SUMMARY

The data appearing in this section are based upon the OTLI mass properties found in Reference 1.1.5. The data are for a complete OTLI installation consisting of both Boeing and other Associate Contractor components. The Aerojet downstage kit weights are based upon data transmitted to Boeing by Aerojet document 0162-01DR-MMP0-1, "Nominal Mass Properties and Dispersions for Minuteman OTLI/AQDS," dated January 28, 1963. All data reflect the use of a linear shaped charge destruct system on the first stage engine.* The total mass properties include the deletion of certain hardware which is removed when the OTLI kit is installed. The check lists found in Reference 1.1.5 give a more detailed summary of the changes.

The OTLI statistical sample for this report consists of fourteen actual weights of OTLI Sections which were reduced to a common basis by standardizing the components called for in the list of materials for each unit. Details of this sample can be found in section 5 of this report. All other items were given mass properties based upon the limited data available.

The dispersion computations found in this report are based upon a population of .990 and a confidence level of 90% in accordance with directions received from STL on 30 January 1963.

* The jet perforator destruct system has been substituted for the linear shaped charge destruct system on the first three missiles to be fired. For data concerning this type of OTLI installation refer to report D2-13957-2.

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4.1 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)

MISSILE CTLI INSTALLATION

COMPONENT TOTAL MISSILE

LINE	STAGE	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²			
				NOM.	DISP.	LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW	NOM.
						NOM.	DISP.	NOM.	DISP.	NOM.	DISP.				
1	I	Pre-launch	0	283.89	3.04	335.09	2.51	106.46	.38	111.25	.29	16.9	1425.0	1418.7	
2			25	283.19	3.04	334.74	2.52	106.44	.38	111.21	.29				
3			50												
4			75												
5		End Action Time	100	283.19	3.04	334.74	2.52	106.44	.38	111.21	.29	16.9	1425.0	1418.7	
6															
7	II	Start Action Time	0	217.28	2.38	259.96	1.72	103.29	.46	106.13	.32	9.4	204.1	201.4	
8			25	217.28	2.38	259.96	1.72	103.29	.46	106.13	.32				
9		Skirt Jettison	35	218.73	2.38	261.38	1.70	103.35	.45	106.23	.31				
10			50												
11			75												
12		End Action Time	100	218.73	2.38	261.38	1.70	103.25	.45	106.23	.31	9.4	204.1	201.4	
13															
14	III	Start Action Time	0	173.73	1.76	230.62	1.11	101.05	.52	102.42	.31	5.7	15.7	14.7	
15		Skirt Jettison	1	175.43	1.76	231.58	1.09	101.14	.52	102.57	.31				
16			25												
17			50												
18			75												
19		End Action Time	100	175.43	1.76	231.58	1.09	101.14	.52	102.57	.31	5.7	15.7	14.7	
20															

EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME

21	I	Silo Heat Protection		.7		476.3		114.4		126.1					
22		Base Heat Protection													
23															
24	II	Aft Interstage 1-2													
25		Jettisoned Fwd Interstage 1-2													
26		Base Heat Protection													
27															
28	III	Aft Interstage 2-3													
29		Jettisoned Fwd Interstage 2-3													
30		Base Heat Protection													
31															

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4.2.1 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																
MISSILE CTLI INSTALLATION																
COMPONENT SECTION 39 - (CTLI SECTION)																
FLIGHT SEQUENCE			% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²				
				NOM.	DISP.	LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL		PITCH	YAW	
L I N E	S T A G E			NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.
1	I	Pre-launch	0	150.12	1.50	54.58	.89	99.72	.55	100.22	.27					
2			25	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
3			50													
4			75													
5		End Action Time	100													
6																
7	II	Start Action Time	0													
8			25													
9		Skirt Jettison														
10			50													
11			75													
12		End Action Time	100													
13																
14	III	Start Action Time	0													
15		Skirt Jettison														
16			25													
17			50	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
18			75													
19		End Action Time	100	150.12	1.50	54.58	.89	99.72	.55	100.22	.27					
20																
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																
21	I	Silo Heat Protection														
22		Base Heat Protection														
23																
24	II	Aft Interstage 1-2														
25		Jettisoned Fwd Interstage 1-2														
26		Base Heat Protection														
27																
28	III	Aft Interstage 2-3														
29		Jettisoned Fwd Interstage 2-3														
30		Base Heat Protection														
31																

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4.2.2 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)

COMPONENT SECTION 42 (GUIDANCE SECTION)

MISSILE CTLI INSTALLATION

S L I N E		FLIGHT SEQUENCE	% EXP	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²		
						LONG. (X)		LAT. (Y)		VERT. (Z)				
WT	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	ROLL NOM.	PITCH NOM.	YAW NOM.			
1	I	Pre-Launch	0	7.34	.41	67.42	.67	111.89	.19	114.29	.23	0	0	0
2			25	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
3			50											
4			75											
5		End Action Time	100											
6														
7	II	Start Action Time	0											
8			25											
9		Skirt Jettison												
10			50											
11			75											
12		End Action Time	100											
13														
14	III	Start Action Time	0											
15		Skirt Jettison												
16			25											
17			50	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
18			75											
19		End Action Time	100	7.34	.41	67.42	.67	111.89	.19	114.29	.23	0	0	0
20														

EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME

21	I Silo Heat Protection										
22	Base Heat Protection										
23											
24	II Aft Interstage 1-2										
25	Jettisoned Fwd Interstage 1-2										
26	Base Heat Protection										
27											
28	III Aft Interstage 2-3										
29	Jettisoned Fwd Interstage 2-3										
30	Base Heat Protection										
31											

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4.2.3 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)

MISSILE CTII INSTALLATION COMPONENT SECTION 44 (STAGE 3 MOTOR)

L I N E		S T A G E	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY				MOMENT OF INERTIA SLOG FEET ²						
					NOM.	DISP.	LONG. (X)	DISP.	NOM.	LAT. (Y)	DISP.	VEERT. (Z)	DISP.	NOM.	PITCH	NOM.	YAW
1	I		Pre-Launch	0	17.97	.83	84.63	1.85	108.65	.29	117.40	.22	0	1	1	1	1
2				25	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
3				50													
4				75													
5			End Action Time	100													
6																	
7	II		Start Action Time	0													
8				25													
9			Skirt Jettison														
10				50													
11				75													
12			End Action Time	100													
13																	
14	III		Start Action Time	0													
15			Skirt Jettison														
16				25													
17				50	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
18				75													
19			End Action Time	100	17.97	.83	84.63	1.85	108.65	.29	117.40	.22	0	1	1	1	1
20																	
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																	
21	I		Silo Heat Protection														
22			Base Heat Protection														
23																	
24	II		Aft Interstage 1-2														
25			Jettisoned Fwd Interstage 1-2														
26			Base Heat Protection														
27																	
28	III		Aft Interstage 2-3														
29			Jettisoned Fwd Interstage 2-3														
30			Base Heat Protection														
31																	

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4.2.4 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																	
COMPONENT SECTION 45 (INTERSTAGE 2-3)																	
MISSILE CTLI INSTALLATION			CENTER OF GRAVITY														
LINE	STAGE	FLIGHT SEQUENCE	% EXP WT	WEIGHT		LONG. (X)			LAT. (Y)			VERT. (Z)			MOMENT OF INERTIA SLUG FEET ²		
				NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	ROLL	PITCH	YAW	
1	I	Pre-Launch	0	17.54	.85	65.65	.74	111.89	.14	120.57	.16				0	1	1
2			25	17.44	.85	65.63	.75	111.89	.14	120.59	.16						
3			50	↑	↑	↑	↑	↑	↑	↑	↑				↑	↑	↑
4			75														
5		End Action Time	100														
6																	
7	II	Start Action Time	0														
8			25														
9		Skirt Jettison															
10			50	↓	↓	↓	↓	↓	↓	↓	↓						↓
11			75														
12		End Action Time	100	17.44	.85	65.63	.75	111.89	.14	120.59	.16				↓	1	1
13																	
14	III	Start Action Time	0	-1.70	0	58.16	0	110.24	0	117.93	0				0	0	0
15		Skirt Jettison		0	0	0	0	0	0	0	0						
16			25														
17			50														
18			75														
19		End Action Time	100														
20																	
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																	
21	I	Silo Heat Protection		.10	0	69.20	0	110.90	0	118.70							
22		Base Heat Protection															
23																	
24	II	Aft Interstage 1-2															
25		Jettisoned Fwd Interstage 1-2															
26		Base Heat Protection															
27																	
28	III	Aft Interstage 2-3		19.14	.85	64.97	.74	111.74	.14	120.35							
29		Jettisoned Fwd Interstage 2-3		1.70	0	58.16	0	110.24	0	117.93							
30		Base Heat Protection															
31																	

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4.2.5 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)														
MISSILE CTLI INSTALLATION														
COMPONENT SECTION 46 (STAGE 2 MOTOR)														
FLIGHT SEQUENCE			% EXP WT	WEIGHT		CENTER OF GRAVITY				MOMENT OF INERTIA				
				NOM.	DISP.	LONG. (X)	LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW	
S L I N E	T A G E			NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.
1	I	Pre-Launch	0	25.86	1.36	101.76	112.58	.22	121.38	.22	0	5	5	5
2			25	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
3			50											
4			75											
5		End Action Time	100											
6														
7	II	Start Action Time	0											
8			25											
9		Skirt Jettison												
10			50	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
11			75											
12		End Action Time	100	25.86	1.36	101.76	112.58	.22	121.38	.22	0	5	5	5
13														
14	III	Start Action Time	0											
15		Skirt Jettison												
16			25											
17			50											
18			75											
19		End Action Time	100											
20														
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME														
21	I	Silo Heat Protection												
22		Base Heat Protection												
23														
24	II	Aft Interstage 1-2												
25		Jettisoned Fwd Interstage 1-2												
26		Base Heat Protection												
27														
28	III	Aft Interstage 2-3												
29		Jettisoned Fwd Interstage 2-3												
30		Base Heat Protection												
31														

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4.2.6 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)														
MISSILE INSTALLATION														
COMPONENT SECTION 47 (INTERSTAGE 1-2)														
STAGE	FLIGHT SEQUENCE	% EXP	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA			
					LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW	SLUG FEET ²
			NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	NOM.	NOM.	NOM.
I	Pre-Launch	0	24.35	1.02	75.24	1.61	114.94	.15	125.47	.16	0	2	2	
2		25	23.75	1.02	75.13	1.65	114.93	.15	125.42	.17				
3		50												
4		75												
5	End Action Time	100	23.75	1.02	75.13	1.65	114.93	.15	125.42	.17				
6														
7	Start Action Time	0	-1.45	0	55.35	0	112.14	0	120.51	0	0	0	0	
8		25	-1.45	0	55.35	0	112.14	0	120.51	0	0	0	0	
9	Skirt Jettison		0	0	0	0	0	0	0	0				
10		50												
11		75												
12	End Action Time	100												
13														
14	Start Action Time	0												
15	Skirt Jettison													
16		25												
17		50												
18		75												
19	End Action Time	100												
20														
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME														
21	I Silo Heat Protection		.60	0	79.50	0	115.0	0	127.30	0				
22	Base Heat Protection													
23														
24	II Aft Interstage 1-2		25.20	1.02	73.99	1.61	114.77	.15	125.14	.16				
25	Jettisoned Fwd Interstage 1-2		1.45	0	55.25	0	112.14	0	120.51	0				
26	Base Heat Protection													
27														
28	III Aft Interstage 2-3													
29	Jettisoned Fwd Interstage 2-3													
30	Base Heat Protection													
31														

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MISSILE CTEI INSTALLATION																			
C.7 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																			
COMPONENT SECTION 48 (STAGE 1 MOTOR)																			
L I N E		S T A G E	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²						
							LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW				
					NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.			
1	I	Pre-Launch	0	30.75	1.44	112.10	2.60	117.64	.24	130.08	.23	2	50	50					
2			25	↑	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑					
3			50	↑	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑					
4			75	↑	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑					
5		End Action Time	100	30.75	1.44	112.10	2.60	117.64	.24	130.08	.23	2	50	50					
6																			
7	II	Start Action Time	0																
8			25																
9		Skirt Jettison	50																
10			75																
11		End Action Time	100																
12																			
13																			
14	III	Start Action Time	0																
15		Skirt Jettison	25																
16			50																
17			75																
18		End Action Time	100																
19																			
20																			
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																			
21	I	Silo Heat Protection																	
22		Base Heat Protection																	
23																			
24	II	Aft Interstage 1-2																	
25		Jettisoned Fwd Interstage 1-2																	
26		Base Heat Protection																	
27																			
28	III	Aft Interstage 2-3																	
29		Jettisoned Fwd Interstage 2-3																	
30		Base Heat Protection																	
31																			

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4.1.3 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)															
MISSILE C7LI INSTALLATION															
COMPONENT SECTION 49 (AFT SKIRT)															
LINE	S T A G E	FLIGHT SEQUENCE	% EXP VT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²			
				NOM.	DISP.	LONG. (X)	LAT. (Y)	VERT. (Z)	ROLL	PITCH	YAW				
1	I	Pre-launch	0	9.96	.68	74.50	.77	119.46	.43	128.43	.49	0	0	0	0
2			25	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
3			50	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
4			75	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
5		End Action Time	100	9.96	.68	74.50	.77	119.46	.43	128.43	.49	0	0	0	0
6															
7	II	Start Action Time	0												
8			25												
9		Skirt Jettison													
10			50												
11			75												
12		End Action Time	100												
13															
14	III	Start Action Time	0												
15		Skirt Jettison													
16			25												
17			50												
18			75												
19		End Action Time	100												
20															
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME															
21	I	Silo Heat Protection													
22		Base Heat Protection													
23															
24	II	Aft Interstage 1-2													
25		Jettisoned Fwd Interstage 1-2													
26		Base Heat Protection													
27															
28	III	Aft Interstage 2-3													
29		Jettisoned Fwd Interstage 2-3													
30		Base Heat Protection													
31															

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WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 39	PRE-LAUNCH	150.12	1.50	223.30	0.89	99.72	0.55	100.22	0.27			
SECT 42	PRE-LAUNCH	7.34	0.41	246.14	0.67	111.89	0.19	114.29	0.23			
SECT 44	PRE-LAUNCH	17.97	0.83	294.85	1.85	108.65	0.29	117.40	0.22			
SECT 45	PRE-LAUNCH	17.54	0.85	337.64	0.74	111.89	0.14	120.57	0.16			
SECT 46	PRE-LAUNCH	25.86	1.36	412.10	1.90	112.58	0.22	121.38	0.22			
SECT 47	PRE-LAUNCH	24.35	1.02	494.51	1.61	114.94	0.15	125.47	0.16			
SECT 48	PRE-LAUNCH	30.75	1.44	590.46	2.60	117.64	0.24	130.08	0.23			
SECT 49	PRE-LAUNCH	9.96	0.68	775.50	0.77	119.46	0.43	128.43	0.49			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.295505E 05	0.697079E 04	0.179061E 04	0.292893E 06	0.613008E 03	0.163655E 04
WDX/W	WDY/W	WDZ/W	WDXX/W	WDYY/W	WDZZ/W
0.606	0.294	0.149	1.906	0.087	0.142

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
PRE-LAUNCH	283.89	3.04	345.09	2.51	106.45	0.48	111.25	0.29			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	LY	IZ
SECT 39	PRE-LAUNCH	150.12	1.50	223.30	0.89	99.72	0.55	100.22	0.27			
SECT 42	PRE-LAUNCH	7.34	0.41	246.14	0.67	111.83	0.19	114.29	0.23			
SECT 44	PRE-LAUNCH	17.97	0.83	274.85	1.85	108.65	0.29	117.40	0.22			
SECT 45	251 80 ST I	17.44	0.85	337.62	0.75	111.69	0.14	120.59	0.16			
SECT 46	PRE-LAUNCH	25.86	1.36	412.10	1.90	112.58	0.22	121.38	0.22			
SECT 47	SA ST II	-1.45	0.	474.62	0.	112.14	0.	120.51	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.215654E 05	0.688457E 04	0.170151E 04	0.510650E 75	0.273794E 03	0.758210E 03
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.676	0.392	0.170	1.040	0.076	0.127

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	LY	IZ
START ACTION ST 2	217.24	2.39	250.46	1.77	103.29	0.46	106.13	0.32			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 39	PRE-LAUNCH	150.12	1.50	223.30	0.89	99.72	0.55	100.22	0.27			
SECT 42	PRE-LAUNCH	7.34	0.41	246.14	0.67	111.89	0.19	114.29	0.23			
SECT 44	PRE-LAUNCH	17.97	0.83	294.85	1.85	108.65	0.29	117.40	0.22			
SECT 45	SA ST III	-1.70	0.	330.15	0.	110.24	0.	117.93	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.1898C2E 05	0.684625E 04	0.166135E 04	0.300309E 04	0.534936E 02	0.189191E 03
WDX/W 0.793	WDY/W 0.476	WDZ/W 0.235	DWDY/W 0.315	DWDY/W 0.046	DWDZ/W 0.079

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
START ACTION 1 ST 3	173.73	1.76	230.63	1.11	101.95	0.52	102.42	0.31			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
6301	BODY SECT	145.53	1.48	54.54	0.91	99.47	0.55	99.89	0.25			
6302	CABLE ASSY	2.21	0.22	56.50	1.00	109.80	0.50	116.00	0.50			
6304	CONDUIT SUPT	0.91	0.07	56.31	0.33	111.60	0.	111.60	0.			
6306	INSTL KIT	1.27	0.	54.50	0.	100.60	0.	100.60	0.			
6312	BMS 5-62	0.20	0.02	54.50	0.	111.50	0.	111.50	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.175433E 05	0.640786E 04	0.132491E 04	0.196618E-00	0.580171E 01	0.129761E 02
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.882	0.533	0.242	0.003	0.016	0.024

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
SECT 39 PRE LAUNCH	150.12	1.50	54.58	0.89	99.72	0.55	100.22	0.27			

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WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
6302	CABLE ASSY	1.98	0.20	65.80	1.00	110.50	0.50	117.20	0.50			
6304	CONDUIT SUPT	4.54	0.36	68.91	0.84	112.59	0.	113.19	0.			
6009	RACEWAY INSTL	-0.20	0.	66.60	0.	111.00	0.	109.80	0.			
6306	INSTL KIT	0.62	0.01	62.70	0.	111.80	0.	112.10	0.			
6312	BMS 5-62	0.40	0.04	65.40	0.	110.50	0.	113.50	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.184639E 02	0.980100E 00	0.980100E 00	0.401913E-00	0.143952E-00	0.496958E-00
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.585	0.135	0.135	0.086	0.052	0.096

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
SECT 42 PRE LAUNCH	7.34	0.41	67.42	0.67	111.89	0.19	114.29	0.23			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6302	CABLE ASSY	6.47	0.65	92.90	1.00	111.20	0.50	118.40	0.50			
6304	CCNDUIT SUPT	15.64	0.50	85.56	1.73	110.62	0.	117.92	0.			
6C05	RACEWAY INSTL	-9.93	0.	80.15	0.	110.19	0.	117.58	0.			
6306	INSTL KIT	1.65	0.09	80.80	0.	110.80	0.	117.90	0.			
6009	STAND INSTL	-0.09	0.	68.50	0.	109.40	0.	116.20	0.			
6312	BMS 5-62	0.20	0.02	80.90	0.	109.30	0.	116.20	0.			
6604	DESTRUCT SYST	4.03	0.04	58.10	0.	99.79	0.	114.04	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.773953E 03	0.104652E 02	0.104652E 02	0.303592E 02	0.389454E 01	0.512755E 00
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
1.548	0.180	0.180	0.307	0.110	0.040

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 44 PRE LAUNCH	17.97	0.83	84.63	1.85	108.65	0.29	117.40	0.22			

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WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6302	CABLE SET	3	4.36	64.90	1.00	112.00	0.50	119.90	0.50			
6304	CCNDUIT SUPT3		15.62	66.82	0.68	111.73	0.	120.25	0.			
6005	RACEWAY INST2		-1.90	57.68	0.	110.30	0.	117.80	0.			
6005	RACEWAY INST3		-2.57	83.70	0.	111.40	0.	117.00	0.			
6306	INSTL KIT	3	1.70	74.90	0.	111.60	0.	119.40	0.			
60C9	STAND INSTL	3	-0.07	78.60	0.	109.60	0.	119.50	0.			
6312	BMS 5-62	2	0.20	53.60	0.	110.80	0.	116.70	0.			
6312	BMS 5-62	3	0.20	85.00	0.	103.00	0.	101.80	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.131828E 03	0.475240E 01	0.475240E 01	0.246968E 01	0.485871E-01	0.312874E-00
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.655	0.124	0.124	0.090	0.013	0.032

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 45 PRE LAUNCH	17.54	0.85	65.65	0.74	111.89	0.14	120.57	0.16			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6302	CABLE ASSY	10.75	1.08	111.10	1.00	112.80	0.50	121.20	0.50			
6304	CCNDUIT SUPT	21.95	0.80	109.19	1.52	112.20	0.	121.20	0.			
6005	RACEWAY INSTL	-15.84	0.	103.05	0.	111.88	0.	120.71	0.			
6306	INSTL KIT	1.91	0.05	88.78	0.	111.80	0.	120.40	0.			
6303	TIMER INTER	1.50	0.15	67.10	0.	112.50	0.	121.80	0.			
6310	BATTERY SQUIB	1.40	0.16	63.90	0.	112.50	0.	121.80	0.			
6604	DISTRUCT SYST	4.19	0.03	74.75	0.	111.77	0.	120.38	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.122872E 04	0.288906E 02	0.288906E 02	0.201775E 03	0.151291E-00	0.675612E-01
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
1.355	0.208	0.208	0.549	0.015	0.010

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 46 PRE LAUNCH	25.86	1.36	101.76	1.90	112.58	0.22	121.38	0.22			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6302	CABLE ASSY 3	5.48	0.55	71.20	1.00	115.80	0.50	126.40	0.50			
6304	CCNDUIT SUPT3	22.87	0.85	78.81	1.52	114.96	0.	125.92	0.			
6005	RACEWAY INST2	-1.45	0.	55.35	0.	112.14	0.	120.51	0.			
6005	RACEWAY INST3	-4.27	0.	101.40	0.	115.70	0.	128.30	0.			
6306	INSTL KIT 3	1.32	0.08	87.40	0.	115.30	0.	125.90	0.			
6009	STAND INSTL 3	-0.10	0.	99.80	0.	115.80	0.	126.00	0.			
6312	BMS 5-62 3	0.50	0.05	94.70	0.	102.00	0.	103.40	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.123845E 04	0.750760E 01	0.750760E 01	0.160423E 02	0.645397E 00	0.162796E 01
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
1.445	0.113	0.113	0.164	0.033	0.052

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SLECT 47 PRE LAUNCH	24.35	1.02	75.24	1.61	114.94	0.15	125.47	0.16			

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WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6302	CABLE ASSY	13.12	1.31	156.40	1.00	118.20	0.50	130.50	0.50			
6304	CCNDUIT ASSY	13.13	0.54	79.31	0.98	117.33	0.	130.03	0.			
6005	RACEWAY INSTL	-8.07	0.	82.76	0.	117.20	0.	129.80	0.			
6306	INSTL KIT	2.68	0.03	78.17	0.	117.20	0.	129.50	0.			
6303	TIMER INTER	1.50	0.15	70.60	0.	117.70	0.	130.50	0.			
6310	BATTERY SQUIB	1.40	0.16	66.70	0.	117.70	0.	130.50	0.			
6312	BMS 5-62	0.80	0.08	161.30	0.	116.20	0.	128.00	0.			
6604	DESTRUCT SYST	6.19	0.04	78.14	0.	116.90	0.	129.25	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.337704E 03	0.430336E 02	0.430336E 02	0.379182E 04	0.575661E 00	0.342169E-00
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.598	0.213	0.213	2.003	0.025	0.019

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 48 PRL LAUNCH	30.75	1.44	112.10	2.60	117.64	0.24	130.08	0.23			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
6302	CABLE ASSY	6.63	0.66	73.20	1.00	118.20	0.50	130.50	0.50			
6306	INSTL KIT	3.41	0.18	74.03	0.	121.67	0.	124.08	0.			
6009	STAND INSTL	-0.28	0.	57.00	0.	116.40	0.	128.40	0.			
6312	BMS 5-62	0.20	0.02	101.30	0.	119.20	0.	133.90	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.439569E 02	0.109892E 02	0.109892E 02	0.103501E 01	0.848594E 00	0.249263E 01
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.666	0.333	0.333	0.102	0.092	0.159

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
SECT 49 PRE LAUNCH	9.96	0.68	74.50	0.77	119.46	0.43	128.43	0.49			

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DATA SAMPLES FOR MAJOR COMPONENTS

The following pages summarize by major components the data samples used to derive the means and dispersion values used in the preceding sections of this document. The components include the CTLI section, both interstages, the aft skirt, the three base heat deflectors, and raceway covers and caps. Sample data for components other than these are not listed in detail, but are summarized by part number under the applicable figure A. Details are on file and can be supplied upon request.

The data includes the effect of incorporating committed ECP's on the hardware. Thus far the effect of these ECP's is not discernible on the interstages or the aft skirt since manufacturing tolerances are greater than the committed weight changes. However, on the CTLI section a weight change due to installation of kits under ECP's 525, 551 and 578 has caused an average weight increase of .4 pound. These kits have been retrofitted to all CTLI sections so all the data samples are still in the same configuration.

The dispersion computations found in this report are based upon a population of .990 and a confidence level of 90% in accordance with STL directions received on 30 January 1963. The "K" factors used in the following statistical analyses were taken from tables in Techniques of Statistical Analysis edited by Eisenhart, Hastay and Wallis.

NOMENCLATURE EXPLANATION FOR FOLLOWING PAGES

- AW - Average weight.
- (KB)W - Weight dispersion.
- W - Summation of individual weight samples.
- WSQ - Summation of squares of individual weight samples.
- WN - Quantity of weight samples used.
- KW - "K" factor from tables.
- SW - Standard deviation for weight samples.
- (Nomenclature for x, y, and z is similar to above)

W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
145.06	54.21	99.42	100.00	144.96	54.16	99.19	99.98	145.67	54.43	99.48	99.95
146.11	54.26	99.31	99.81	144.78	54.30	99.29	99.84	145.76	54.23	99.23	99.75
145.71	54.76	99.57	99.90	145.27	54.78	99.63	99.88	145.31	54.70	99.55	99.88
146.00	54.76	99.55	99.95	145.61	54.79	99.64	99.86	145.51	54.69	99.59	99.85
146.00	54.74	99.55	99.91	145.80	54.71	99.52	99.94				

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 330 6301 25-25402-035 CTII SECTION
 AW= 145.54 (KS)W= 1.48 AX= 54.54 (KS)X= .91
 AY= 99.47 (KS)Y= .55 AZ= 99.89 (KS)Z= .25
 W= 2037.55 WSQ= 296545.76 WN= 14 KW=3.618 SW= .41
 X= 763.52 XSQ= 41641.03 XN= 14 KX=3.618 SX= .25
 Y= 1392.52 YSQ= 138508.29 YN= 14 KY=3.618 SY= .15
 Z= 1398.50 ZSQ= 139700.22 ZN= 14 KZ=3.618 SZ= .07

BOEING

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W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
170.45	67.63	99.45	100.83	174.70	67.63	99.45	100.84	172.45	67.80	99.46	100.86
171.15	67.76	99.53	100.83	170.80	67.67	99.40	100.61	173.60	67.60	99.54	101.00
171.20	67.47	99.34	100.70	172.45	67.47	99.44	100.82	172.60	67.66	99.58	100.69
171.60	67.52	99.35	100.75	172.90	67.61	99.40	100.79	172.35	67.50	99.57	100.62
173.65	67.53	99.34	100.78	169.55	67.46	99.47	100.88	170.65	67.57	99.42	100.68
169.60	67.66	99.46	100.67	169.30	67.51	99.48	100.81	173.78	67.79	99.68	100.76
170.53	67.64	99.28	100.66	172.43	67.76	99.41	100.73	171.18	67.55	99.43	100.72
171.03	67.58	99.41	100.85	172.23	67.54	99.18	100.99	171.50	67.57	99.56	100.85
170.15	67.67	99.32	100.79	169.95	67.60	99.36	100.83	169.55	67.62	99.16	100.96
169.20	67.55	99.26	100.81	171.10	67.50	99.31	100.71	169.90	67.54	99.18	100.84
171.50	67.62	99.33	100.75	171.05	67.47	99.38	100.69	168.76	67.66	99.61	100.80
166.30	67.49	99.30	100.86	167.10	67.69	99.34	100.71	168.45	67.57	99.36	100.89
168.10	67.54	99.24	100.77	168.20	67.62	99.37	100.81	167.45	67.60	99.27	100.82
167.65	67.56	99.31	100.74	166.40	67.53	99.29	100.74	166.80	67.57	99.12	100.83
168.10	67.79	99.54	100.73	168.25	67.57	99.31	100.88	168.52	67.67	99.35	100.63
168.34	67.43	99.53	100.96	168.52	67.57	99.06	100.90	166.52	67.64	99.24	100.96
167.55	67.70	99.46	100.84	168.20	67.57	99.24	100.74	167.20	67.64	99.15	100.67
167.80	67.52	99.40	100.78	167.80	67.68	99.48	100.83	167.35	67.62	99.37	100.82
168.75	67.61	99.33	100.68	168.80	67.47	99.31	100.75	168.00	67.53	99.45	100.78
167.70	67.58	99.31	100.83	166.20	67.62	99.32	100.91	166.50	67.66	99.36	100.84
167.50	67.62	99.27	100.88	166.30	67.72	99.24	100.64	166.85	67.56	99.27	100.84
166.40	67.72	99.23	100.77	167.80	67.78	99.28	100.86	168.45	67.67	99.35	100.90
165.50	67.70	99.44	100.88	167.30	67.66	99.41	100.59	168.60	67.59	99.49	100.72
168.30	67.72	99.40	100.82	166.05	67.68	99.20	101.04	169.85	67.62	99.34	100.83
168.20	67.64	99.05	100.84	165.75	67.64	99.31	100.97	165.75	67.54	99.34	100.86
168.00	67.63	99.17	101.03	167.50	67.54	99.34	100.89	168.70	67.65	99.24	100.82
169.45	67.55	99.45	100.75	167.40	67.61	99.29	100.86	168.70	67.65	99.38	100.83
167.35	67.67	99.35	100.89	167.75	67.57	99.39	100.82	167.00	67.51	99.41	100.66

BOEING

(INTERSTAGE 2-3)

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W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
167.85	67.52	99.50	100.79	167.65	67.66	99.37	100.95	168.50	67.44	99.24	100.96
168.00	67.55	99.31	100.86	166.65	67.47	99.33	100.97	168.95	67.57	99.33	100.98
168.20	67.52	99.35	100.84	167.70	67.61	99.25	100.92	168.75	67.62	99.22	100.89
167.25	67.53	99.54	100.72	167.60	67.61	99.69	100.95	168.75	67.55	99.36	100.73
168.85	67.62	99.34	100.89	169.80	67.54	99.41	100.96	168.80	67.53	99.41	100.88
169.95	67.62	99.23	100.82	167.80	67.66	99.26	100.83	168.35	67.70	99.19	100.84
168.65	67.60	99.44	100.70	169.00	67.40	99.44	100.85	169.10	67.70	99.27	100.71
168.20	67.58	99.15	100.90	169.45	67.65	99.31	100.87	169.90	67.74	99.33	100.74
170.00	67.64	99.50	100.73	169.45	67.69	99.43	100.82	169.75	67.51	99.42	100.84
169.75	67.61	99.52	100.94	169.75	67.59	99.28	100.79	170.00	67.59	99.32	100.80
168.55	67.60	99.41	100.75	170.05	67.83	99.33	100.80	168.85	67.71	99.25	100.75
169.55	67.62	99.26	100.78	169.90	67.63	99.43	100.75	167.45	67.66	99.18	100.88
169.45	67.59	99.31	100.88	167.80	67.63	99.39	100.71	169.00	67.51	99.37	100.78
168.55	67.60	99.46	100.74	168.75	67.47	99.37	100.85	168.35	67.46	99.35	100.72
169.00	67.60	99.45	100.92	169.65	67.61	99.32	100.69	169.75	67.60	99.32	100.72
169.25	67.54	99.28	100.97	168.70	67.75	99.32	100.79	168.35	67.44	99.33	100.86
170.40	67.62	99.31	100.87	168.20	67.59	99.33	100.78	169.15	67.50	99.48	100.94
169.65	67.52	99.27	100.84	169.70	67.56	99.25	100.86	169.50	67.57	99.34	100.83
170.20	67.60	99.24	100.88	168.85	67.49	99.46	100.95	169.60	67.50	99.41	100.88
169.20	67.45	99.41	100.79	168.75	67.65	99.40	100.75	169.75	67.51	99.42	100.67
169.10	67.57	99.29	100.93	170.75	67.81	99.14	100.74	168.85	67.60	99.34	100.88
167.95	67.50	99.24	100.86	170.50	67.55	99.41	100.69	170.60	67.61	99.40	100.76
168.60	67.50	99.41	101.01	169.15	67.65	99.27	100.72	168.80	67.55	99.18	100.77
168.65	67.66	99.26	100.81	167.65	67.53	99.16	100.70	170.40	67.57	99.37	100.85
168.95	67.52	99.39	100.80	170.80	67.62	99.37	100.81	167.20	67.51	99.21	100.97
169.20	67.52	99.28	100.86	168.95	67.54	99.14	100.76	167.75	67.55	99.26	101.04
168.90	67.47	99.27	100.72	168.10	67.55	99.51	100.72	167.00	67.46	99.23	100.86
168.15	67.67	99.30	100.85	168.50	67.54	99.37	100.81	169.95	67.73	99.42	100.77

BOEING

(INTERSTAGE 2-3)

BOEING D2-13957-5

W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
169.00	67.49	99.47	100.95	168.60	67.49	99.30	100.84	170.05	67.63	99.32	100.85
168.40	67.60	99.33	100.85	166.10	67.56	99.31	100.84	168.40	67.50	99.39	100.91
170.00	67.55	99.32	100.78	169.70	67.62	99.53	100.82	168.75	67.56	99.28	100.70
169.55	67.53	99.36	100.73	170.35	67.63	99.15	100.91	168.55	67.53	99.35	100.91
170.60	67.56	99.16	100.95	168.75	67.59	99.38	100.78	170.80	67.54	99.20	100.84
167.90	67.48	99.30	100.79	168.55	67.39	99.34	100.82	167.85	67.56	99.53	100.66

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
050 6501 25-27204-064 INTERSTAGE 2-3

AW=	169.00	(KS)W=	4.48	AX=	67.59	(KS)X=	.23
AY=	99.35	(KS)Y=	.31	AZ=	100.82	(KS)Z=	.26
W=	31434.44	WSQ=	5312977.58	WN=	186	KW=2.771	SW= 1.62
X=	12571.63	XSQ=	849710.30	XN=	186	KX=2.771	SX= .08
Y=	18478.39	YSQ=	1835759.76	YN=	186	KY=2.771	SY= .11
Z=	18752.03	ZSQ=	1890531.84	ZN=	186	KZ=2.771	SZ= .09

BOEING

W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
353.55	78.22	99.77	100.30	359.30	78.11	99.58	100.19	357.25	78.24	99.86	100.12
353.85	78.23	99.64	100.17	359.25	78.17	99.72	100.08	359.55	78.21	99.68	100.18
359.35	78.16	99.86	100.33	355.75	78.03	99.68	100.12	354.20	78.10	99.81	100.25
358.00	78.11	100.00	100.34	355.65	78.13	99.73	100.16	352.30	78.23	99.81	100.23
352.95	78.30	99.72	100.33	354.05	78.27	99.77	100.17	350.80	78.26	99.78	100.25
353.60	78.07	99.78	100.34	351.30	78.13	99.65	100.45	359.70	78.10	99.90	100.42
354.80	78.04	99.86	100.51	354.95	77.97	99.96	100.24	354.47	77.88	99.74	100.45
351.46	77.89	99.94	100.37	357.91	77.90	99.79	100.25	353.06	78.01	100.01	100.39
354.27	78.03	99.93	100.36	351.97	77.93	99.74	100.40	358.27	77.80	99.92	100.43
350.67	77.80	99.92	100.17	351.37	77.91	99.81	100.51	355.12	78.09	99.95	100.49
352.37	77.93	99.83	100.29	360.52	78.16	100.12	100.35	350.57	78.05	99.81	100.31
354.87	78.06	99.83	100.33	353.22	77.73	99.77	100.26	354.17	77.84	99.83	100.40
356.75	77.87	99.71	100.51	357.92	77.90	99.92	100.17	360.42	77.77	99.68	100.24
357.22	77.93	99.72	100.18	358.46	77.95	99.94	100.26	353.86	77.76	99.76	100.30
359.41	77.97	99.81	100.18	357.56	78.01	99.79	100.34	360.12	78.02	99.73	100.18
357.37	77.93	99.80	100.47	355.62	78.10	99.92	100.49	355.12	78.06	99.89	100.27
357.47	78.00	99.78	100.35	359.90	77.79	99.73	100.26	357.10	77.94	99.88	100.53
354.30	77.84	100.05	100.43	356.70	77.91	99.94	100.16	360.92	77.98	99.82	100.23
355.75	78.06	99.69	100.30	354.90	77.98	99.80	100.19	354.15	77.93	99.97	100.36
356.65	77.91	99.73	100.37	351.95	78.12	99.98	100.24	357.00	77.94	99.71	100.26
358.50	77.74	99.85	100.31	351.40	77.72	100.04	100.18	352.70	78.03	99.98	100.26
355.70	77.92	99.79	100.33	353.80	77.92	99.93	100.33	353.15	77.93	99.87	100.36
353.15	78.01	99.98	100.30	355.20	77.93	99.82	100.35	355.25	77.87	99.85	100.43
352.10	77.80	99.99	100.34	357.00	77.91	99.95	100.21	356.95	77.92	99.99	100.36
353.35	77.99	99.86	100.49	349.90	77.71	99.85	100.43	357.80	77.96	99.96	100.40
354.70	77.68	99.87	100.48	356.20	77.95	99.89	100.27	355.30	77.88	99.93	100.26
356.65	77.89	99.94	100.22	356.60	77.92	99.79	100.37	352.65	77.91	99.88	100.25
352.05	77.92	100.07	100.49	357.55	77.88	100.03	100.14	355.55	77.84	99.83	100.44

BOEING

(INTERSTAGE 1-2)

W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
354.40	77.88	99.90	100.36	356.15	77.89	99.97	100.21	355.80	77.92	100.00	100.13
353.45	77.91	99.97	100.32	356.80	77.92	100.00	100.43	358.35	77.88	99.83	100.47
358.25	77.84	99.96	100.48	355.15	77.72	99.78	100.25	351.30	78.00	99.90	100.58
355.25	77.96	99.94	100.35	357.50	77.97	99.73	100.33	355.00	77.97	99.83	100.27
358.25	77.89	99.84	100.37	355.00	77.89	99.95	100.40	354.15	77.93	99.73	100.37
354.75	77.96	99.93	100.19	354.85	77.87	99.76	100.29	356.20	77.92	99.79	100.39
355.95	77.79	99.76	100.45	357.30	77.83	99.93	100.33	354.40	77.99	99.96	100.19
353.35	77.83	99.89	100.43	353.40	77.89	99.85	100.28	356.05	77.72	100.10	100.15
351.85	77.81	99.80	100.32	355.05	77.93	99.86	100.23	357.85	78.01	99.99	100.11
353.50	77.86	99.90	100.32	358.40	77.92	99.84	100.39	354.80	77.80	99.98	100.38
355.55	77.94	99.88	100.55	354.85	77.95	99.76	100.39	359.80	77.92	99.78	100.42
355.20	77.79	99.88	100.36	355.60	77.94	99.92	100.27	356.95	77.97	100.01	100.28
355.60	77.92	99.80	100.34	355.95	77.89	99.90	100.44	356.45	77.96	99.73	100.29
354.75	77.95	99.95	100.41	359.60	78.08	99.78	100.25	353.15	77.91	99.84	100.35
354.05	77.87	99.79	100.40	355.15	77.96	99.90	100.24	353.65	77.92	99.86	100.40
357.35	77.87	100.06	100.39	355.80	77.85	99.80	100.35	357.90	78.07	99.85	100.30
360.35	77.88	99.88	100.51	359.40	77.83	100.16	100.18	355.15	77.98	99.66	100.35
355.55	77.84	99.93	100.44	355.40	77.91	99.91	100.55	356.30	77.90	99.85	100.35
357.05	77.90	100.01	100.46	354.55	77.99	100.06	100.44	355.35	78.00	99.77	100.47
355.95	77.87	99.83	100.32	355.65	77.85	99.69	100.22	355.35	77.91	99.93	100.22
355.90	77.97	99.90	100.19	356.10	77.92	99.82	100.37	355.80	77.85	99.84	100.20
356.80	77.92	99.98	100.32	355.05	77.97	100.10	100.02	355.90	77.99	100.12	100.48
358.25	77.89	99.98	100.25	357.15	77.89	100.25	100.45	356.25	78.11	99.93	100.17
357.15	77.90	99.85	100.23	358.45	77.94	99.96	100.15	357.75	78.00	99.95	100.34
357.50	77.79	99.87	100.29	360.95	77.87	99.87	100.36	357.50	77.84	100.08	100.36
362.20	77.80	100.08	100.07	356.05	77.62	100.13	100.38	361.40	78.05	99.94	100.18
355.45	77.92	99.90	100.22	351.15	77.75	100.03	100.43	350.40	77.97	99.93	100.48
354.65	77.94	99.86	100.37	354.15	77.96	99.77	100.34	358.45	77.94	99.72	100.15

BOEING

(INTERSTAGE 1-2)

BOEING D2-13957-5

W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
353.10	77.92	100.09	100.20	352.65	77.92	100.09	100.24	350.90	77.73	100.04	100.48
353.90	77.95	99.87	100.33	356.65	77.95	99.82	100.23	354.05	77.84	99.92	100.30
354.85	77.92	99.72	100.29	356.25	77.97	99.62	100.34	356.25	77.90	100.09	100.31
356.55	77.96	99.89	100.29	353.35	77.99	100.09	100.46	358.30	77.92	99.80	100.30
357.30	77.94	99.95	100.34	357.75	77.99	99.87	100.25	357.15	77.92	100.00	100.52
357.00	78.09	99.88	100.43	359.35	77.96	100.01	100.38	358.65	78.00	99.86	100.29

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 0/0 6701 25-27201-011 INTERSTAGE 1-2
 AW= 355.76 (KS)W= 6.72 AX= 77.94 (KS)X= .32
 AY= 99.88 (KS)Y= .33 AZ= 100.32 (KS)Z= .30
 W= 66170.56 WSQ= 23541641.94 W4= 186 KW=2.771 SW= 2.43
 X= 14497.03 XSQ= 1129915.80 X4= 186 KX=2.771 SX= .12
 Y= 18577.50 YSQ= 1855505.29 Y4= 186 KY=2.771 SY= .12
 Z= 18659.70 ZSQ= 1871961.40 Z4= 186 KZ=2.771 SZ= .11

BOEING

W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
334.75	69.08	100.50	100.52	340.00	68.64	100.40	100.51	344.45	69.17	100.34	100.53
339.95	68.93	100.35	100.42	350.50	69.13	100.52	100.46	342.00	69.08	100.18	100.53
342.27	69.02	100.38	100.54	343.30	69.13	100.35	100.37	346.05	69.04	100.47	100.57
345.00	69.11	100.52	100.51	342.00	69.03	100.57	100.40	335.32	69.13	100.60	100.66
345.15	69.19	100.44	100.50	344.25	69.06	100.59	100.46	345.75	69.17	100.39	100.64
341.60	69.20	100.58	100.39	348.45	69.26	100.53	100.42	344.50	69.22	100.33	100.42
334.55	69.27	100.46	100.54	342.30	69.10	100.37	100.54	341.80	69.25	100.27	100.56
343.15	69.10	100.01	100.48	343.75	69.19	100.41	100.47	342.80	68.92	100.47	100.51
339.25	68.97	100.27	100.45	340.65	69.13	100.38	100.47	344.05	68.94	100.37	100.58
338.30	69.13	100.48	100.69	341.80	69.07	100.29	100.48	339.60	69.20	100.32	100.64
346.00	69.02	100.20	100.57	343.10	69.11	100.27	100.38	340.85	69.09	100.65	100.46
344.40	69.12	100.08	100.45	341.90	69.01	100.31	100.53	340.80	69.05	100.54	100.63
340.10	69.00	100.38	100.39	341.35	69.06	100.40	100.51	344.15	68.99	100.29	100.47
343.20	69.11	100.33	100.47	338.60	69.16	100.43	100.53	346.45	69.07	100.10	100.53
344.25	69.01	100.32	100.52	344.85	69.15	100.59	100.30	335.55	69.34	100.37	100.57
342.15	69.19	100.32	100.44	335.85	69.07	100.11	100.46	346.40	69.35	100.29	100.45
338.30	69.10	100.36	100.36	339.70	69.24	100.46	100.61	334.15	69.17	100.42	100.56
341.60	69.21	100.40	100.52	341.25	69.47	100.51	100.49	341.85	69.18	100.19	100.56
342.85	69.23	100.37	100.52	334.85	69.25	100.55	100.60	338.15	69.31	100.57	100.32
340.65	69.16	100.43	100.48	337.35	69.42	100.44	100.52	341.90	69.30	100.48	100.51
340.60	69.20	100.39	100.50	338.15	69.27	100.24	100.46	342.75	69.15	100.37	100.49
340.10	69.22	100.42	100.30	344.10	69.23	100.38	100.42	342.95	69.27	100.51	100.43
344.85	69.37	100.50	100.30	343.60	69.32	100.37	100.41	342.00	69.30	100.39	100.40
341.55	69.41	100.52	100.46	347.05	69.34	100.34	100.57	342.75	69.30	100.43	100.61
344.05	69.09	100.44	100.55	345.05	69.24	100.47	100.56	344.10	69.26	100.62	100.51
342.50	69.27	100.27	100.40	347.65	69.26	100.47	100.52	344.65	69.36	100.60	100.43
347.25	69.22	100.28	100.59	343.70	69.24	100.42	100.61	345.05	69.36	100.63	100.58
344.45	69.17	100.38	100.48	343.00	69.30	100.61	100.53	344.70	69.25	100.29	100.48

BOEING

(AFT SKIRT)

BOEING D2-13957-5

W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
341.15	69.24	100.56	100.53	343.80	69.34	100.22	100.40	343.35	69.28	100.38	100.66
341.95	69.27	100.21	100.43	346.80	69.18	100.19	100.44	340.95	69.36	100.48	100.48
342.60	69.13	100.44	100.40	347.45	69.31	100.30	100.63	347.05	69.03	100.31	100.48
344.50	69.19	100.32	100.66	342.95	69.11	100.24	100.45	342.40	69.45	100.32	100.57
341.20	69.27	100.30	100.48	343.30	69.29	100.44	100.56	344.60	69.32	100.40	100.39
343.55	69.22	100.59	100.61	339.35	69.28	100.52	100.48	339.95	69.27	100.42	100.56
343.05	69.27	100.36	100.40	344.10	69.35	100.38	100.48	344.05	69.28	100.26	100.54
343.25	69.38	100.41	100.66	339.00	69.23	100.36	100.66	336.55	69.20	100.48	100.38
340.00	69.27	100.58	100.63	344.00	69.18	100.30	100.55	336.65	69.12	100.24	100.62
332.70	69.10	100.43	100.65	337.55	69.26	100.40	100.54	335.30	69.24	100.50	100.38
339.35	69.20	100.54	100.62	340.25	69.22	100.46	100.40	341.30	69.16	100.44	100.35
336.30	69.15	100.31	100.60	332.95	69.18	100.55	100.42	339.40	69.22	100.41	100.51
340.40	69.17	100.35	100.47	334.45	69.07	100.56	100.67	334.95	69.18	100.39	100.46
334.35	69.29	100.36	100.47	335.45	69.16	100.51	100.60	333.35	69.23	100.44	100.55
341.15	69.17	100.23	100.49	338.15	69.19	100.40	100.61	336.70	69.24	100.40	100.64
334.85	69.24	100.35	100.56	337.75	69.22	100.53	100.52	336.90	69.24	100.46	100.65
336.20	69.11	100.43	100.71	333.45	69.24	100.44	100.58	336.90	69.08	100.36	100.43
339.15	69.14	100.49	100.38	338.85	69.11	100.49	100.53	335.30	69.30	100.49	100.42
340.10	69.06	100.53	100.58	335.60	69.16	100.45	100.29	335.35	68.96	100.52	100.52
339.55	69.10	100.43	100.41	337.90	69.04	100.53	100.45	340.05	69.00	100.39	100.51
338.35	69.25	100.44	100.38	338.10	69.21	100.27	100.38	338.15	69.13	100.41	100.57
333.55	69.27	100.43	100.46	339.15	69.21	100.52	100.64	338.20	69.34	100.62	100.56
336.00	69.18	100.57	100.49	339.65	69.23	100.31	100.49	335.00	69.19	100.53	100.70
329.35	69.08	100.35	100.67	332.80	68.98	100.37	100.61	335.10	69.07	100.43	100.57
334.90	69.22	100.57	100.61	338.80	69.36	100.42	100.56	335.35	69.24	100.41	100.60
338.25	69.21	100.47	100.77	336.85	69.28	100.42	100.52	337.60	69.39	100.41	100.57
340.95	69.31	100.40	100.52	342.40	69.35	100.58	100.53	344.35	69.35	100.46	100.20
342.15	69.22	100.48	100.67	348.10	69.33	100.66	100.48	339.40	69.25	100.50	100.49

BOEING

(AFT SKIRT)

W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
336.70	69.17	100.61	100.55	334.70	69.17	100.57	100.68	338.40	69.05	100.25	100.35
341.80	69.22	100.59	100.47	342.90	69.34	100.40	100.56	341.30	69.18	100.29	100.54
335.30	69.08	100.39	100.46	335.20	69.14	100.45	100.35	337.05	69.31	100.58	100.68
334.75	69.10	100.59	100.57	334.25	69.19	100.31	100.45	334.80	69.28	100.44	100.52
337.50	69.32	100.59	100.58	338.05	69.21	100.54	100.49	338.40	69.44	100.48	100.37
341.45	69.04	100.18	100.57	336.90	69.27	100.51	100.64	335.55	69.38	100.47	100.38
344.05	69.27	100.47	100.47	340.40	69.19	100.28	100.46				

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT

190 6901 25-27207-003 AFI SKIRT

AW= 340.36 (KSI)W= 10.83 AX= 69.19 (KSI)X= .33

AY= 100.42 (KSI)Y= .33 AZ= 100.51 (KSI)Z= .26

W= 63987.69 WSQ= 21781711.87 WN= 188 KW=2.771 SW= 3.91

X= 13008.47 XSQ= 900110.51 XN= 188 KX=2.771 SX= .12

Y= 18878.24 YSQ= 1895683.20 YN= 188 KY=2.771 SY= .12

Z= 18895.82 ZSQ= 1899214.54 ZV= 188 KZ=2.771 SZ= .10

BOEING

M	5.79	133.00	X	5.79	133.30	M	5.79	133.33	X	5.74	133.19	M	6.25	133.29	X
	6.48	133.19		6.23	133.05		6.22	133.04		6.42	133.20		6.32		
	5.93	132.94		6.34	132.48		6.41	132.94		6.22	133.04		6.26	133.44	
	6.12	133.38		6.27	133.44		6.41	133.44		6.36	132.88		6.33	132.74	
	6.18	132.94		6.26	132.96		6.25	133.01		6.14			6.16	133.06	
	6.14	133.04		6.12	132.96		6.12	133.04		6.11	132.94		6.28	133.04	
	6.15	133.04		6.15			6.21			6.08	133.34		6.07	133.04	
	6.10			6.05			6.06			6.03					
	6.04			6.14			6.13			6.08			6.09		
				6.05			6.10			6.05			6.05		
	6.12			6.03			6.09			6.03			6.02		
	6.01			6.02			6.13			6.02			6.00		
	6.03			6.04			6.02			6.05			5.98		
	6.03			6.01			6.10			6.04			6.02		
	6.02			6.05			6.02						6.13		
	6.08			6.00			6.29			6.22			6.19		
	6.07			6.03			6.03			6.18			6.22		
	6.01			6.04			6.05			6.00			6.08		
	6.03			6.20			6.21			6.00			6.02		
	6.03			6.05			6.02			6.14			6.22		
	6.17			6.03			6.06			6.21			6.17		
	6.13			6.12			6.24			6.05			6.22		
	6.05			6.04			6.13			6.18			6.20		
	6.20			6.23			6.21			6.07			6.27		
	6.22			6.14			6.22			6.26			6.19		
	6.14			6.24			6.19			6.26			6.30		
	6.14			6.28			6.16			6.18			6.25		
	6.23			6.01			6.10			6.08			6.02		

BOEING

(BASE HEAT DEFLECTOR - STAGE 3)

BOEING D2-13957-5

W	6.25	X	.	W	6.28	X	.	W	6.22	X	.	W	6.07	X	.
	6.03	.	.		6.05	.	.		6.21	.	.		6.21	.	.
	6.06	.	.		6.10	.	.		6.11	.	.		6.16	.	.
	6.12	.	.		6.28	.	.								

340 6006 25-25878-002 BASE HEAT DEFLECTOR
 W = 1133.00 WSQ = 6941.44 WY = 185 KW = 2.771 SW = .12
 X = 5057.67 XSQ = 673160.26 XN = 38 KX = 5.083 SX = .21
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AX = 6.12 (KSI)W = .33 AX = 133.10 (KSI)X = .66
 BOEING

W	18.64	X	191.00	W	18.65	X	190.60	W	19.00	X	190.56	W	18.79	X	190.52	W	19.72	X	190.46
	20.08		190.52		20.09		190.56		20.12		190.68		19.85		190.72		19.96		190.80
	19.13		190.26		19.95		191.06		20.17		190.91		19.99		190.79		19.94		190.86
	19.95		190.86		20.03		190.66		20.02		190.96		20.33		190.66		20.11		190.66
	20.14		190.66		19.91		190.85		20.10		190.66		20.08		190.62		19.90		190.74
	20.22		190.76		20.32		190.46		20.00				20.28				20.26		
	20.33				20.11				20.39				20.23				20.00		
	20.09				20.31				19.93				19.93				19.95		
	20.09				20.14				20.16				19.95				20.15		
	19.89				20.19				20.19				20.08				20.03		
	20.13				20.11				20.18				19.91				20.04		
	20.02				20.29				20.56				20.05				20.04		
	20.07				20.23				20.21				20.20				20.16		
	20.03				20.00				20.19				20.16				20.22		
	20.25				20.24				20.25				20.15				20.27		
	20.33				20.27				20.12				20.19				20.20		
	20.27				20.22				20.12				20.59				20.34		
	20.32				20.35				20.36				20.34				20.22		
	20.37				20.36				20.26				20.43				20.30		
	20.36				20.23				20.44				20.37				20.39		
	20.27				20.54				20.59				19.86				20.35		
	20.45				20.33				20.44				20.33				20.30		
	20.49				20.49				20.48				20.39				20.22		
	20.32				19.89				20.37				20.30				20.21		
	19.94				20.47				20.34				20.38				20.40		
	20.92				19.82				20.35				20.38				20.34		
	20.30				20.57				20.34				20.54				20.47		
	20.45				20.92				20.17				20.26				20.50		

BOEING

(BASE HEAT DEFLECTOR - STAGE 2)

BOEING D2-13957-5

W	X	W	X	W	X	W	X	W	X
20.55	.	20.33	.	20.46	.	20.44	.	19.82	.
20.44	.	20.48	.	20.07	.	20.40	.	20.42	.
20.42	.	20.51	.	20.46	.	20.55	.	20.47	.
20.36	.								

260 6008 25-25877-002 BASE HEAT DEFLECTOR
 W = 3775.06 WSQ = 1200041.73 XN = 33 KX = 3.133 SX = .17
 X = 6292.96 XSQ =
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AW = 20.19 (KS)W = .88 AX = 190.70 (KS)X = .54
 76227.71 WN = 187 KW = 2.771 SW = .52
 BOEING

W	22.90	317.30	X	22.88	317.60	W	22.45	317.62	X	23.39	317.65	W	21.32	318.56	X
	21.29	319.24		21.26	318.34		21.41	318.50		21.32	318.58		21.22	318.34	
	22.77	317.34		20.98	318.96		21.05	318.34		21.51	318.50		21.20	318.34	
	21.13	318.34		21.22	318.76		21.19	318.68		21.28	318.72		21.44	318.40	
	21.30	318.20		21.27	318.83		21.30	318.83		21.35	318.74		21.30	318.84	
	21.28	318.54		21.23	318.30		21.30	318.34		21.36	318.30		21.37	318.34	
	21.37			20.96			21.49			21.42			21.49		
	21.21			21.38			21.45			21.90			21.48		
	21.32			21.41			21.31			21.32			21.36		
	21.39			21.45			21.15			21.16			21.28		
	21.02			20.93			21.18			21.66			21.28		
	21.30			21.31			21.45			21.37			21.03		
	21.57			21.40			21.60			21.29			20.94		
	21.31			21.46			21.32			21.30			21.21		
	21.34			21.15			21.24			20.96			21.45		
	21.23			21.20			21.18			21.42			21.22		
	21.30			21.46			21.28			21.37			21.33		
	21.45			21.28			21.29			21.37			21.18		
	21.42			21.26			21.50			21.28			21.30		
	21.41			21.30			21.34			21.24			21.31		
	21.24			21.15			21.20			21.19			21.39		
	21.30			21.42			21.22			21.25			21.22		
	21.29			21.32			21.54			21.16			21.76		
	21.38			21.14			21.23			21.29			21.17		
	21.33			21.32			21.20			20.90			21.21		
	21.27			21.28			21.15			21.36			21.22		
	21.22			21.21			21.43			21.39			21.32		
	21.36			21.42			21.34			21.19			21.32		

BOEING

(BASE HEAT DEFLECTOR - STAGE 1)

W	21.28	X	.	W	21.30	X	.	W	21.30	X	.	W	21.30	X	.
21.20	.	21.31	.	21.33	.	21.32	.	21.33	.	21.30	.	21.51	.	21.25	.
21.30	.	21.26	.	21.19	.	21.39	.	21.39	.	21.40	.	21.39	.	21.39	.
21.42	.	21.48	318.60	21.29	.	21.39	.	21.39	.	21.40	.	21.39	.	21.39	.

180 6007 25-25876-002 BASE HEAT DEFLECTOR
 W= 4013.50 WSQ= 85700.10 WV= 188 KW=2.771 SW= .31
 X=11461.81 XSQ= 3649259.88 XN= 36 KX=3.102 SX= .46
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AW= 21.35 (KS)W= .87 AX=318.38 (KS)X= E.43
 BOEING

W	W	W	W	W	W	W	W	W	W	W	W	W
6.80	6.80	7.00	6.98	6.99	6.81	7.11	6.80	6.66	6.73			
6.64	6.75	6.66	6.79	6.71	7.14	6.62	5.84	6.61	6.96			
7.11	7.14	6.86	7.18	6.91	6.96	6.89	6.94	6.82	7.13			
6.63	6.52	6.70	6.50	6.73	6.64	6.60	6.81	6.64	6.79			
6.65	6.71	6.85	6.49	6.41	6.57	6.56	6.88	6.64	6.62			
6.81	6.69	6.80	6.61	6.60	6.53	6.63	6.57	6.67	6.74			
6.81	6.80	6.72	6.80	6.87	6.51	6.66	6.80	6.60	6.72			
6.84	6.62	6.90	6.80	6.79	6.74	6.59	6.44	6.83	7.05			
6.56	6.87	6.90	6.80	6.64	6.72	6.83	6.67	6.49	6.61			
6.88	6.72	6.57	6.80	6.55	6.90	6.59	6.55	6.86	6.89			
6.75	6.83	6.67	-	-	6.67	-	6.63	6.80	6.65			
6.76	6.68	6.74	6.55	6.78	6.76	6.84	6.61	6.64	6.61			
6.75	6.71	6.68	6.60	7.04	6.75	6.79	6.79	6.50	6.77			
6.63	6.62	6.70	6.77	6.58	6.80	6.62	6.89	6.69	6.81			
6.72	6.62	6.74	6.70	6.64	6.76	6.63	6.64	6.65	6.69			
6.64	6.63	6.50	6.59	6.86	6.64	6.97	6.75	6.66	7.18			
6.82	6.75	-	7.00	6.72	7.17	6.54	6.92	6.56	6.98			
6.47	6.42	6.40	6.27	6.99	6.39	7.47	6.70	6.28	6.88			
6.39	6.45	7.33	6.48	6.97	6.91	6.42	6.38	7.01	6.33			
6.51	7.13	6.86	6.74	6.38	6.85	7.07						

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 260 6005 25-27214-027 RACEWAY COVER

$$W = \frac{1299.83}{8761.37} \text{ WSQ} = \frac{193}{6.73} \text{ KW} = 2.768 \text{ SW} = \frac{.54}{.19}$$

BOEING

BOEING

D2-13957-5

W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
6.49	6.37	6.74	6.31	6.23	6.29	6.35	6.62	6.48	6.56								
6.53	6.38	6.44	6.34	6.54	6.83	6.41	6.34	6.61	6.64								
6.38	6.53	6.41	6.65		6.33		6.51	6.16	6.44								
6.24	6.17	6.23	6.31	6.46	6.31	6.32	6.62	6.46	6.43								
6.62	6.52	6.61	6.68	6.35	6.38	6.31	6.12	6.18	6.09								
6.48	6.57	6.28		6.62	6.35	7.44	6.56	7.32	6.26								
6.26		6.84	6.27	6.44	6.62	6.17	6.00	7.09	5.95								
7.09	6.27	6.31	6.45	6.28	6.40	6.32		6.55	6.11								
6.51	6.50	6.33	6.34	6.56	6.45	6.37	6.42	6.58	6.44								
6.44	6.44	6.36	6.38	6.52	6.39	6.44	6.11	6.45	6.61								
5.91	6.41	7.20					6.19	6.59	6.01								
6.57	6.63	6.24	6.51	6.37	6.46	6.43	6.33	6.26	6.38								
6.39	6.32	6.43	6.43	6.32	6.41	6.53	6.55	6.43	6.40								
6.41	6.42	6.17		6.29	6.50	6.51	6.30	6.15	6.12								
6.20	6.24	6.19	6.53	6.21	6.19	6.61	6.30	6.00	6.39								
6.44	6.33	6.28	6.58	6.27	6.56	6.45	6.34	6.34	6.47								
6.25	6.31	6.19	6.26	6.50	6.48	6.51	6.20		6.33								
6.38	6.18	6.17	6.35	6.16	7.37	6.43	6.43	6.18	6.34								
6.25	6.36	6.39	6.19	6.53	6.45	6.36	6.60	6.56	6.48								
6.39	6.50	6.26	6.60	7.01	6.96	6.51	6.48	6.31	6.43								

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 180 6005 25-27214-030 RACEWAY COVER
 W= 1220.11 WSQ= 7844.94 WN= 190 KN=2.768 SW= .23
 AW= 6.42 (KS)W= .63

BOEING

BOEING

D2-13957-5

W	W	W	W	W	W	W	W	W	W	W
6.50	6.58	6.13	6.18	6.37	6.34	6.80	6.31	6.44	6.35	
6.36	6.16	6.59	6.39	6.24	6.43	6.44	6.27	6.28	6.12	
6.47	6.26	6.49	6.21	6.30	6.32	6.43	6.36	6.40	6.32	
6.47	6.33	6.53	6.51	6.14	6.44	6.35	6.25	6.39	6.43	
6.28	6.19	6.36	6.05	6.79	6.44	6.36	6.43	6.85	6.20	
6.49	6.12	6.47	6.50	6.30	6.35	6.96	6.40	6.62	6.29	
6.31	6.46	6.20	6.56	6.60	6.23	6.25	6.35	6.49	6.47	
6.28	6.50	6.16	6.05	6.32	6.02	6.79	6.17	6.50	6.84	
6.18	6.34	6.54	6.19	6.64	6.57	6.43	6.26	6.27	6.67	
6.38	6.36	6.88	6.40	6.16	6.55	6.40	6.18	6.30	6.40	
6.58	6.24	6.34	6.76		6.72	6.01	6.36			

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 180 6005 25-27214-031 RACEWAY COVER AW= 6.35 (KSI)W= .59
 W= 2343.23 WSG= 14897.32 WN= 369 KW=2.710 SW= .22

BOEING

BOEING

D2-13957-5

.88	.90	.86	.88	.90	.91	.87	.91	.85	.87	.87	.87	.86
.89	.91	.90	.94	.96	.89	.90	.89	.90	.93	.94	.94	.90
.90	.90	.88	.93	.90	.90	.88	.90	.88	.95	.91	.91	.97
.90	.91	.92	.91	.99	.88	.93	.88	.93	.85	.88	.88	.90
.89	.93	.88	.86	.95	.91	.92	.93	.92	.93	.87	.91	.91
.94	.91	.97	.95	.95	.93	1.01	.93	1.01	.98	.92	.92	.98
.95	.93	.92	.94	.94	.96	.99	.99	.99	.93	.96	.93	.90
.90	.93	.94	.92	.94	.96	.96	.96	.96	.91	.93	.93	.93
.93	.93	.95	.96	.92	.93	.96	.93	.96	.95	.95	.95	.96
.88	.87	.95	.92	.94	.96	.99	.96	.99	.87	.92	.92	.94
.92	.93	.90	.92	.95	.94	.92	.94	.92	.97	.90	.90	.91
.90	.85	.81	.85	.95	.92	.95	.92	.92	.97	.93	.93	.97
.94	.90	.92	.94	.96	.94	.96	.94	.89	.83	.86	.86	.96
.96	.90	.85	.94	.94	.89	.94	.89	.94	.84	.90	.90	.93
.90	.93	.94	.89	.85	.86	.89	.86	.89	.86	.88	.88	.91
.93	.92	.91	.90	.85	.89	.89	.89	.89	.89	.86	.86	.91
.93	.86	.89	.88	.85	.88	.79	.88	.79	.95	.88	.87	.87
.94	.92	.89	.88	.94	.92	.92	.92	.92	.92	.91	.91	.90
.93	.91	.95	.91	.89	.90	.94	.90	.94	.89	.91	.91	.90
.91	.96	.85	.91	.93	.86	.89	.86	.89	.92	.87	.87	.88

BOEING D2-13957-5

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT

072 6005 25-27217-001 RACEWAY CAP

W= 175.93 H50=

AW= 160.62 Wn= 193 Kw=2.768 SM= .04

.10

BOEING

W	1.92	1.92	1.97	1.93	1.96	1.94	1.97	1.95
W	1.96	1.97	1.97	1.98	1.98	2.01	2.04	1.95
W	2.04	2.01	2.00	2.02	1.98	1.99	2.01	2.00
W	2.01	2.05	2.00	1.89	1.98	1.94	2.06	2.00
W	1.97	1.96	2.08	1.97	2.09	1.99	2.07	1.97
W	1.95	2.00	1.98	2.05	1.96	1.99	2.06	2.08
W	2.03	2.04	2.01	2.14	2.01	2.06	1.98	2.00
W	1.97	2.07	2.01	2.00	2.04	1.98	2.06	2.00
W	2.06	2.06	2.02	1.92	2.00	1.99	2.04	1.95
W	2.00	2.03	2.13	2.07	2.08	2.00	2.02	2.00
W	1.99	1.99	2.03	2.12	2.15	2.10	2.02	2.15
W	2.21	2.13	2.00	2.11	2.02	2.09	2.04	2.11
W	2.10	2.13	1.99	2.12	2.12	2.19	2.09	2.09
W	2.01	2.04	2.19	2.12	2.12	2.06	2.05	2.10
W	1.98	2.11	2.17	1.99	1.96	1.97	2.15	2.07
W	2.10	2.08	2.14	2.14	2.05	2.15	2.09	2.12
W	2.11	2.13	2.08	2.15	2.12	2.05	2.08	2.01
W	2.08	2.12	2.08	2.06	2.12	2.12	2.18	2.07
W	2.06	2.14	2.10	2.11	2.11	2.11	2.09	2.07
W	2.02	2.06	2.07	2.18	2.09	2.13	2.13	2.06

BOEING POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT BOEING

340 6005 25-27220-006 RACEWAY CAP AW= 2.05 (KS)W= .19

W= 395.19 WSQ= 810.13 WN= 193 KW=2.768 SW= .07

W	W	W	W	W	W	W	W	W
.28	.31	.31	.31	.31	.31	.32	.33	.37

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 260 6005 25-27209-025 RACEWAY WIRE SUPPORT

$$\frac{W=}{2.85 \pm 50=}$$

$$\frac{AW=}{9 \text{ KW}=4.098 \text{ SW}=}$$

BOEING

BOEING D2-13957-5

W	W	W	W	W	W	W	W	W
.29	.30	.31	.31	.32	.32	.32	.33	.33
.34								

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 260 6005 25-27209-027 RACEWAY WIRE SUPPORT AW= .32 (KS)W= .07
 W= 3.81 WSQ= 1.21 WN= 12 KW=3.758 SW= .02

BOEING

BOEING D2-13957-5

BOEING D2-13957-5

POPULATION	99 PER CENT	CONFIDENCE LEVEL	90 PER CENT
6005 25-35471-001 RACEWAY WIRE SUPPORT		AW=	1.11 (KS)W=
W=	325.75 WSQ=	361.96 WN=	294 KW=2.727 SW=
			.06

BOEING

W	W	W	W	W	W	W	W	W	W	W
1.07	1.09	1.11	1.11	1.15	1.15	1.16	1.16	1.16	1.17	1.17
1.17	1.17	1.17	1.18	1.19	1.19	1.21	1.21	1.21	1.22	1.22
1.24	1.24	1.24	1.25	1.25	1.25	1.26	1.26	1.27	1.27	1.27
1.28	1.28	1.28	1.29	1.29	1.30	1.30	1.30	1.32	1.34	

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 180 6005 25-35769-002 RACENAY WIRE SUPPORT AW= 1.22 (KS)W= .20
 W= 47.50 WSQ= 58.02 WN= 39 KW=3.075 SW= .07

BOEING

BOEING D2-13957-5

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
6009	BMS 5-62 44	1.99	1.35	295.82	0.	108.60	0.	114.90	0.			
6009	BMS 5-62 45-3	0.53	0.76	366.99	0.	103.00	0.	101.80	0.			
6009	BMS 5-62 45-2	1.65	0.98	332.69	0.	102.80	0.	102.00	0.			
6009	BMS 5-62 45-1	0.77	0.75	331.39	0.	110.00	0.	112.10	0.			
6009	BMS 5-62 46	1.92	1.22	423.04	0.	109.80	0.	117.00	0.			
6009	BMS 5-62 47-3	0.70	0.61	513.97	0.	102.00	0.	103.40	0.			
6009	BMS 5-62 47-2	1.57	0.95	484.27	0.	99.60	0.	102.20	0.			
6009	BMS 5-62 47-1	0.74	0.95	484.27	0.	99.60	0.	102.20	0.			
6009	BMS 5-62 48	4.92	1.81	645.26	0.	115.70	0.	127.20	0.			
6009	BMS 5-62 49	8.44	3.99	767.30	0.	101.70	0.	103.00	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.	0.	0.	0.886021E 06	0.749775E 03	0.215552E 04
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.	0.	0.	40.520	1.179	1.999

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
BMS 5-62	23.23	5.18	582.39	40.52	106.11	1.18	110.44	2.00			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6009	ATTACH 42	1.02	0.10	259.62	0.	100.00	0.	100.00	0.			
6009	ATTACH 44	0.77	0.	285.26	0.	106.77	0.	111.24	0.			
6009	ATTACH 45-3	1.70	0.	358.87	0.	99.56	0.	102.16	0.			
6009	ATTACH 45-2	0.64	0.	333.02	0.	108.76	0.	112.32	0.			
6009	ATTACH 45-1	2.00	0.	323.10	0.	101.38	0.	101.49	0.			
6009	ATTACH 46	0.87	0.	411.34	0.	108.31	0.	113.32	0.			
6009	ATTACH 47-3	1.35	0.	528.24	0.	100.70	0.	102.33	0.			
6009	ATTACH 47-2	0.49	0.	493.16	0.	114.20	0.	109.69	0.			
6009	ATTACH 47-1	1.47	0.	472.38	0.	102.87	0.	102.87	0.			
6009	ATTACH 48	1.32	0.	647.62	0.	114.73	0.	123.76	0.			
6009	ATTACH 49	1.84	0.	753.56	0.	104.15	0.	106.83	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.	0.	0.	0.403344E 03	0.193564E-00	0.454627E-00
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.	0.	0.	1.491	0.033	0.050

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
ATTACHMENTS	13.47	0.10	460.45	1.49	104.40	0.03	106.74	0.05			

BOEING

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SECT	MRCN	POPULATION	99 PER CENT	CONFIDENCE LEVEL	90 PER CENT	DISP
		PART NO	TITLE		AVG	
180	6010	25-27233-002	INSULATION COVER	AW=	.12 (KS)W=	.00
180	6010	25-27233-003	INSULATION COVER	AW=	.15 (KS)W=	.00
260	6010	25-27233-004	INSULATION COVER	AW=	.13 (KS)W=	.00
260	6010	25-27233-005	INSULATION COVER	AW=	.17 (KS)W=	.00
260	6010	25-27233-006	INSULATION COVER	AW=	.17 (KS)W=	.05
340	6010	25-27233-008	INSULATION COVER	AW=	.20 (KS)W=	.00
052	6010	25-27233-009	INSULATION COVER	AW=	.07 (KS)W=	.00
072	6010	25-27233-010	INSULATION COVER	AW=	.28 (KS)W=	.05
072	6010	25-27233-011	INSULATION COVER	AW=	.10 (KS)W=	.00
052	6010	25-27233-012	INSULATION COVER	AW=	.20 (KS)W=	.00
072	6010	25-27233-013	INSULATION COVER	AW=	.05 (KS)W=	.00
052	6010	25-27233-014	INSULATION COVER	AW=	.06 (KS)W=	.00
072	6010	25-27233-015	INSULATION COVER	AW=	.09 (KS)W=	.00
052	6010	25-27233-016	INSULATION COVER	AW=	.11 (KS)W=	.00
180	6010	25-27233-017	INSULATION COVER	AW=	.08 (KS)W=	.00
052	6010	25-27233-029	INSULATION COVER	AW=	.06 (KS)W=	.00
072	6010	25-27233-030	INSULATION COVER	AW=	.05 (KS)W=	.00
072	6010	25-27233-031	INSULATION COVER	AW=	.06 (KS)W=	.00
052	6010	25-27233-032	INSULATION COVER	AW=	.07 (KS)W=	.08
340	6010	25-27233-034	INSULATION COVER	AW=	.13 (KS)W=	.00

BOEING

SECT	MRCN	POPULATION	99 PER CENT	CONFIDENCE LEVEL	90 PER CENT	DISP
		PART NO	TITLE		AVG	
050	6011	25-28046-003	G+C CABLE CONN INSUL	AW=	.17 (KS)W=	.04
050	6011	25-28046-004	G+C CABLE CONN INSUL	AW=	.18 (KS)W=	.04
050	6011	25-28069-003	G+C CABLE CONN INSUL	AW=	.12 (KS)W=	.06
050	6011	25-28069-004	G+C CABLE CONN INSUL	AW=	.10 (KS)W=	.04
050	6011	25-28089-002	G+C CABLE SUPT INSUL	AW=	.02 (KS)W=	.00
340	6011	25-29822-003	G+C CABLE CONNECT BRKT	AW=	.46 (KS)W=	.08
190	6011	25-29863-004	CABLE SUPT ASSY	AW=	.13 (KS)W=	.07
190	6011	25-29863-006	CABLE SUPT ASSY	AW=	.32 (KS)W=	.09
340	6011	25-30927-003	THRUST STRAP ASSY	AW=	1.10 (KS)W=	.08
070	6011	25-32271-013	ENTRY CHUTE LWR	AW=	.40 (KS)W=	.09
070	6011	25-32271-015	ENTRY CHUTE UP	AW=	.32 (KS)W=	.07
050	6011	25-32340-003	ENTRY CHUTE INSUL	AW=	.06 (KS)W=	.00
050	6011	25-32429-001	UPPER CHUTE	AW=	.71 (KS)W=	.11
050	6011	25-32429-002	LOWER CHUTE	AW=	.56 (KS)W=	.12
050	6011	25-32430-001	ENTRY CHUTE INSUL	AW=	.04 (KS)W=	.00
050	6011	25-32430-002	ENTRY CHUTE INSUL	AW=	.03 (KS)W=	.00
050	6011	25-32430-003	ENTRY CHUTE INSUL	AW=	.07 (KS)W=	.06
050	6011	25-32430-004	ENTRY CHUTE INSUL	AW=	.03 (KS)W=	.05
050	6011	25-32430-005	ENTRY CHUTE INSUL	AW=	.01 (KS)W=	.00
050	6011	25-32430-006	ENTRY CHUTE INSUL	AW=	.02 (KS)W=	.05
070	6011	25-33703-053	RACEWAY SEAL	AW=	.30 (KS)W=	.05
260	6011	26-09508-000	SCREW	AW=	.01 (KS)W=	.00
050	6011	26-10923-002	G+C STRUCT SUPT SPACER	AW=	.03 (KS)W=	.00
050	6011	26-12066-001	ENTRY CHUTE SEAL INSUL	AW=	.01 (KS)W=	.00
050	6011	26-12066-002	ENTRY CHUTE SEAL INSUL	AW=	.02 (KS)W=	.00
070	6011	26-12078-002	BREAKOUT CLAMP INSUL	AW=	.04 (KS)W=	.05

BOEING

SECT	MRCN	POPULATION	99 PER CENT PART NO	TITLE	CONFIDENCE LEVEL	90 PER CENT AVG	DISP
050	6011	26-12435-001	STATIC GRD JUMPER	INSUL	AW=	.10 (KS)W=	.00
050	6011	26-12454-001	STAT GRD JUMP LUG	INSUL	AW=	.03 (KS)W=	.05
050	6011	26-12467-001	G+C CHUTE SPACER	INSUL	AW=	.02 (KS)W=	.00
050	6011	26-12467-003	G+C CHUTE SPACER	INSUL	AW=	.04 (KS)W=	.04
050	6011	26-12541-002	CHUTE ATTACH PLATE		AW=	.02 (KS)W=	.00
340	6011	26-13079-001	THRUST STRAP WASHER		AW=	.00 (KS)W=	.00
340	6011	26-13080-001	CABLE THRUST TERM CLAMP		AW=	.02 (KS)W=	.00
340	6011	26-13082-002	THRUST FITTING KEY		AW=	.00 (KS)W=	.00
340	6011	26-15632-003	CONNECTOR BOOT		AW=	.09 (KS)W=	.00
340	6011	26-15734-001	THRUST FITTING SHIM		AW=	.01 (KS)W=	.00
050	6011	29-21372-003	COVER INSUL		AW=	.02 (KS)W=	.00
050	6011	29-21853-002	ENTRY CHUTE BRKT	INSUL	AW=	.13 (KS)W=	.00
050	6011	29-21857-002	2-3 CHUTE ATTACH	YOKE	AW=	.17 (KS)W=	.05
070	6011	29-22298-001	THRUST FITTING		AW=	.64 (KS)W=	.04
050	6011	29-22299-003	THRUST FITTING ASSY		AW=	.49 (KS)W=	.05
190	6011	29-22784-001	CABLE SUPT RETAINER	SL	AW=	.08 (KS)W=	.05
340	6011	29-23395-003	STATIC GROUND JUMPER		AW=	.18 (KS)W=	.00
340	6011	29-23395-005	STATIC GROUND JUMPER		AW=	.04 (KS)W=	.00
340	6011	29-23398-004	CLAMP FITTING ASSY		AW=	.03 (KS)W=	.00
190	6011	29-24371-002	CABLE CLAMP INSUL		AW=	.21 (KS)W=	.16
190	6011	29-24372-002	CABLE CLAMP		AW=	.08 (KS)W=	.08
050	6011	29-24425-008	ENTRY CHUTE SEAL		AW=	.15 (KS)W=	.00
190	6011	29-24674-001	CABLE SUPT SEAL		AW=	.11 (KS)W=	.00
070	6011	29-24685-001	G+C CLAMP		AW=	.09 (KS)W=	.00
190	6011	29-24955-001	CABLE CLAMP INSUL		AW=	.07 (KS)W=	.05
190	6011	29-24956-001	COVER INSUL		AW=	.05 (KS)W=	.00

BOEING

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SECT	MRCN	PART NO	POPULATION	99 PER CENT TITLE	CONFIDENCE LEVEL	90 PER CENT AVG	DISP
100	6011	29-	2	COVER INSUL	AW=	.04 (KS)W=	.00
100	6011	29-24950-003		COVER INSUL	AW=	.06 (KS)W=	.00
070	6011	29-25299-003		CHUTE SEAL INSUL	AW=	.01 (KS)W=	.00
070	6011	29-25299-004		ROLL INSUL	AW=	.02 (KS)W=	.00
070	6011	29-25299-005		CHUTE SEAL INSUL	AW=	.24 (KS)W=	.17
070	6011	29-25299-006		CHUTE SEAL INSUL	AW=	.42 (KS)W=	.05
050	6011	29-25779-002		CHUTE SEAL INSUL	AW=	.11 (KS)W=	.00
050	6011	29-25779-003		CHUTE SEAL INSUL	AW=	.13 (KS)W=	.05
340	6011	29-26563-001		BRACKET GUIDE ASSY	AW=	.26 (KS)W=	.00

BOEING

POPULATI N
 SECT MRCN P
 053 5070 10-204 50-000 10-204 50-000
 PER CENT
 TITLE
 10-204 50-000 10-204 50-000
 DISARM
 10-204 50-000 10-204 50-000
 90 PER CENT
 AVG
 2.84 (K5)W= .05
 DISP

BOEING

SECT	MRCN	POPULATION	99 PER CENT PART NO	CONFIDENCE LEVEL TITLE	90 PER CENT AVG	DISP
053	6503	10-20451-001	LINEAR EXPLOSIVE	AW=	1.13 (KS)W=	.06
052	6503	10-20451-003	LINEAR EXPLOSIVE	AW=	1.28 (KS)W=	.06
053	6503	10-20451-005	DETONATOR ASSY	AW=	.08 (KS)W=	.00
052	6503	10-20870-018	BOOSTER EXPLOSIVE	AW=	.34 (KS)W=	.00
052	6503	10-20870-021	LINEAR EXPLOSIVE	AW=	.20 (KS)W=	.00
052	6503	10-20870-030	TIME DELAY BOOSTER	AW=	.16 (KS)W=	.00
052	6503	25-25218-015	S+A MECH ASSY	AW=	.61 (KS)W=	.00

BOEING

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SECT	MRCN	POPULATION PART NO	99 PER CENT TITLE	CONFIDENCE LEVEL	90 PER CENT AVG	DISP
051	6507	25-27227-002	INSULATION MOLDED	AW=	.10 (KS)W=	.00
051	6507	25-27227-003	INSULATION MOLDED	AW=	.03 (KS)W=	.03
051	6507	25-27227-004	INSULATION MOLDED	AW=	.03 (KS)W=	.00
051	6507	25-27227-005	INSULATION MOLDED	AW=	.16 (KS)W=	.03
051	6507	25-27228-001	STRUT INSULATED	AW=	1.20 (KS)W=	.26
051	6507	25-27230-005	FRAME INSULATED	AW=	3.46 (KS)W=	.40
052	6507	25-27232-022	GUIDE	AW=	.54 (KS)W=	.09
052	6507	25-27232-023	GUIDE	AW=	.51 (KS)W=	.12

BOEING

SECT	MRCN	POPULATION	99 PER CENT	CONFIDENCE LEVEL	90 PER CENT	DISP
		PART NO	TITLE		AVG	
073	6703	10-20451-002	LINEAR EXPLOSIVE	AW=	1.47 (KS)W=	.05
072	6703	10-20451-004	LINEAR EXPLOSIVE	AW=	1.63 (KS)W=	.07
073	6703	10-20451-005	DETONATOR ASSY	AW=	.08 (KS)W=	.00
072	6703	10-20451-018	BOOSTER EXPLOSIVE	AW=	.34 (KS)W=	.00
072	6703	10-20870-020	LINEAR EXPLOSIVE	AW=	.29 (KS)W=	.00
072	6703	10-20870-026	TIME DELAY BOOSTER	AW=	.33 (KS)W=	.04
072	6703	25-25218-016	S+A MECH ASSY	AW=	.70 (KS)W=	.00

BOEING

BOEING D2-13957-5

SECT	MRCN	POPULATION	99 PER CENT PART NO	TITLE	CONFIDENCE LEVEL	90 PER CENT AVG	DISP
071	6706	25-27221-002	INSUL	MOLDED	AW=	.06 (KS)W=	.03
071	6706	25-27221-003	INSUL	MOLDED	AW=	.03 (KS)W=	.00
071	6706	25-27221-004	INSUL	MOLDED	AW=	.03 (KS)W=	.00
071	6706	25-27221-005	INSUL	MOLDED	AW=	.15 (KS)W=	.00
071	6706	25-27222-005	FRAME	INSUL	AW=	6.45 (KS)W=	1.23
071	6706	25-27224-001	STRUT	INSULATED	AW=	1.45 (KS)W=	.47
071	6706	25-27226-019	GUIDE		AW=	.95 (KS)W=	.16
072	6706	25-27226-027	GUIDE		AW=	.93 (KS)W=	.14

BOEING